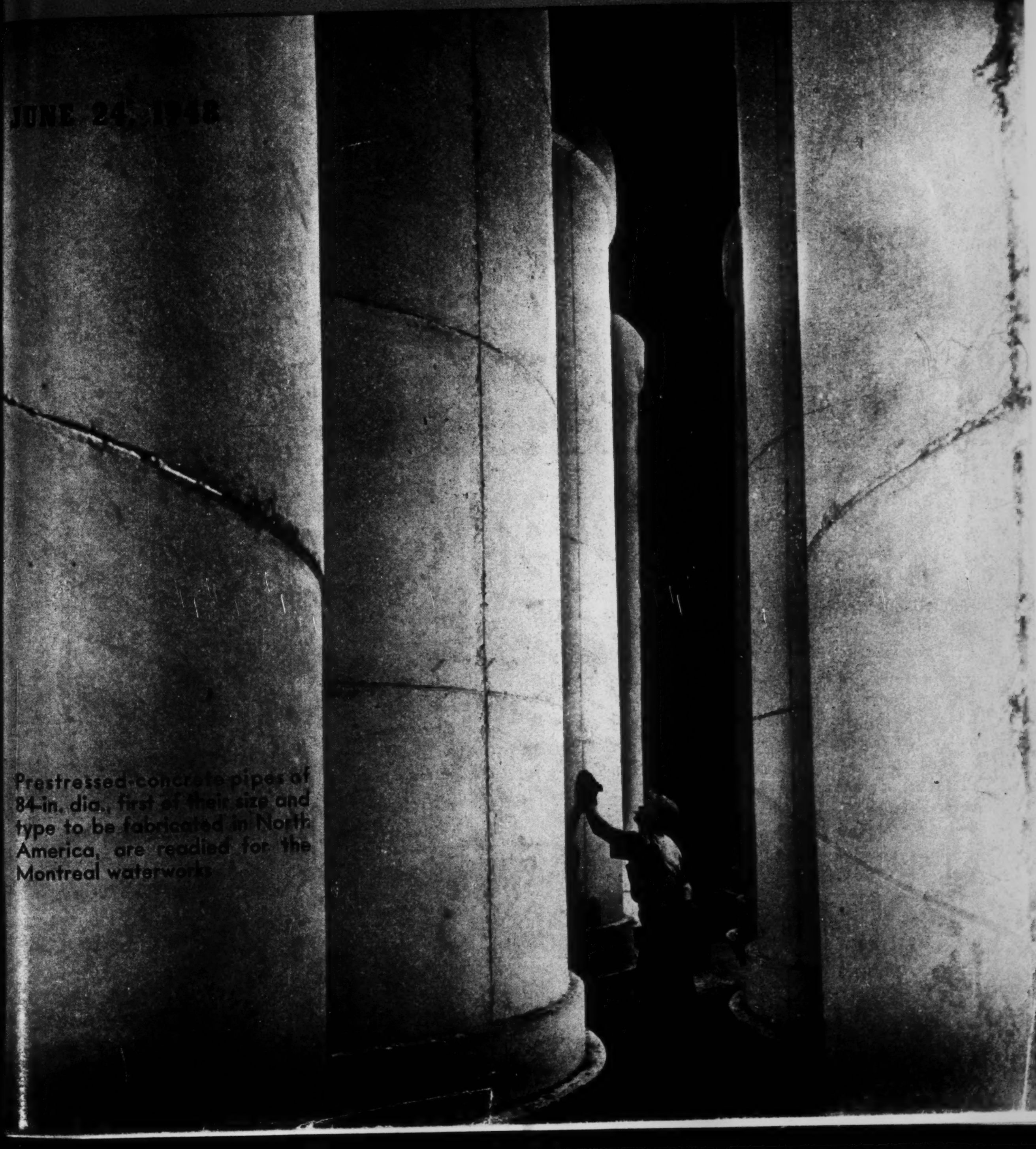
ENGINEERING NEWS-RECORD

A McGRAW-HILL PUBLICATION

JUNE 24, 1948



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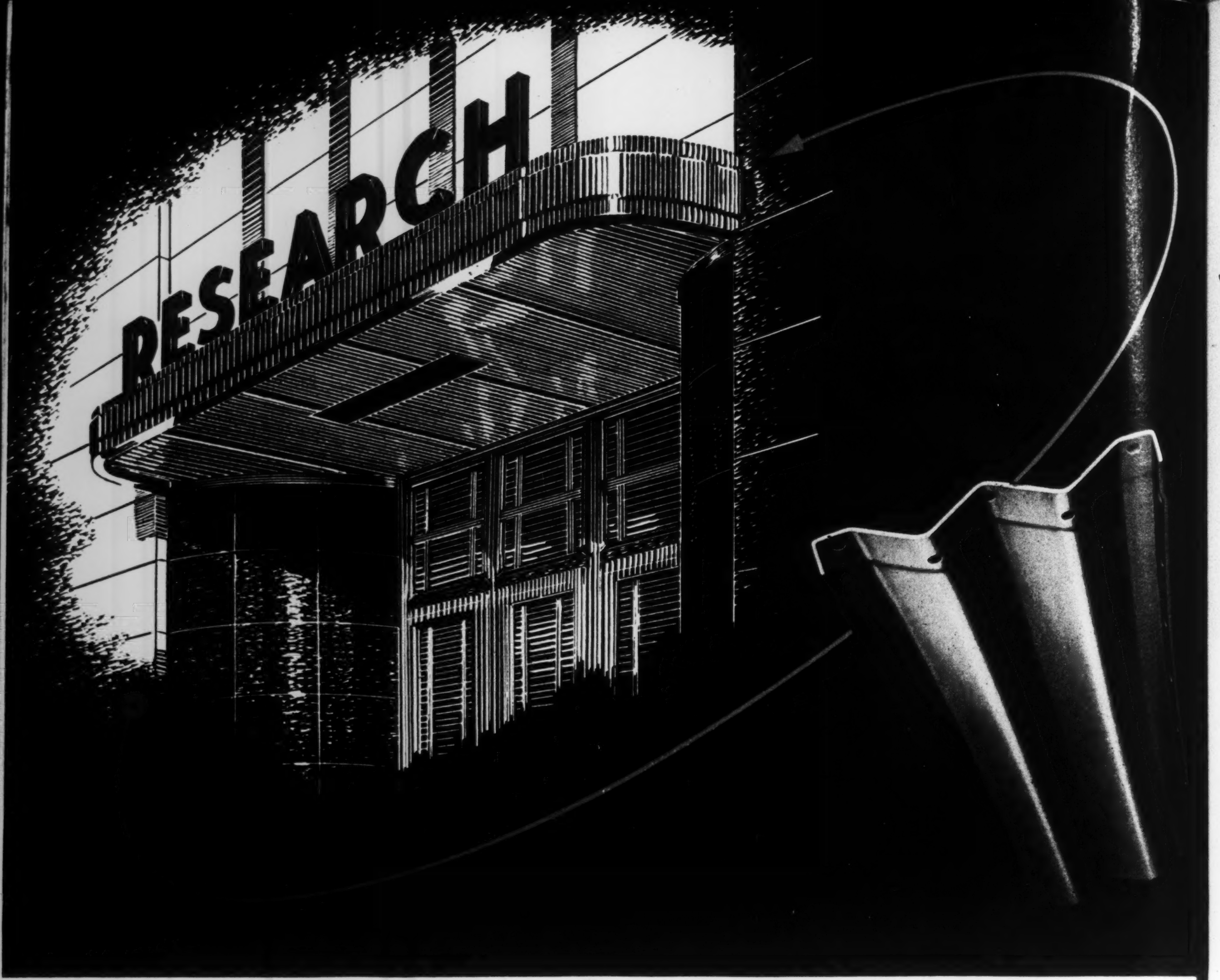

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Volume 140 • Number 26

ENGINEERING NEWS-RECORD

June 24, 1948

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FEATURE

INDEX FOR VOLUME 140

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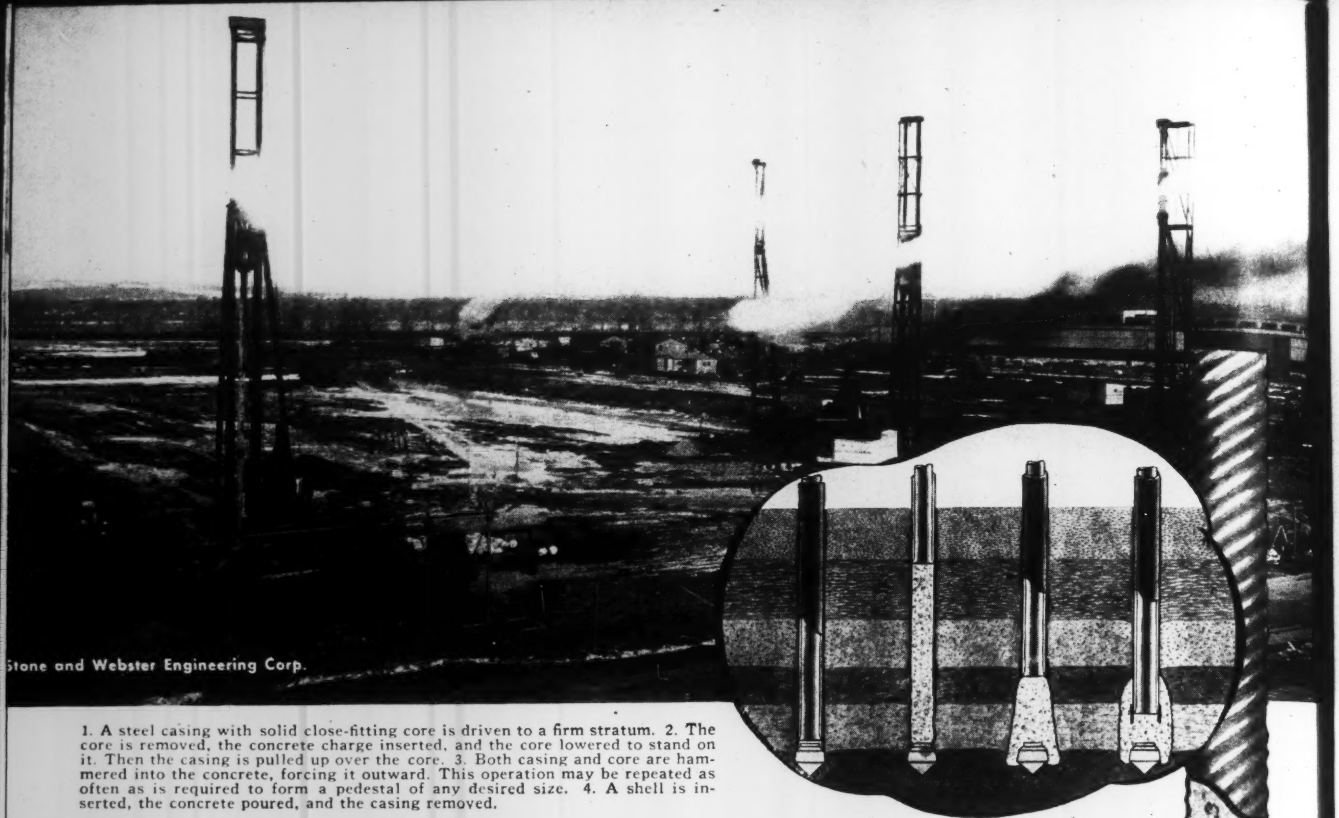

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WESTERN'S PEDESTAL PILES* BEST IN VIBRATION TEST

DAMAGE DUE TO SETTLEMENT of foundations, attributed to heavy crane movements, occurred in the original turbine building of the General Electric Co., Schenectady, N. Y. Before constructing a new turbine building, tests were conducted to determine the type of pile that would best resist settlement under heavy loads and vibration.

ALL PILES tested showed modest settlement under static loads. With the exception of the Pedestal Pile, all showed a consistent tendency, while under test load, to penetrate farther into the soil during vibration than when carrying static loads only. Pedestal Piles, with a cased concrete shaft seated well down into the enlarged bulb of concrete, showed better carrying capacity under static load than friction piles, and showed no settlement under vibration.

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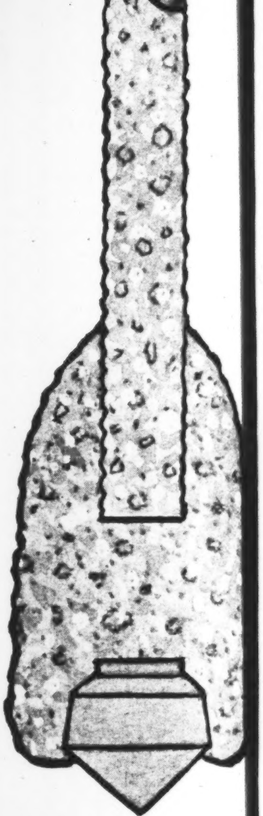

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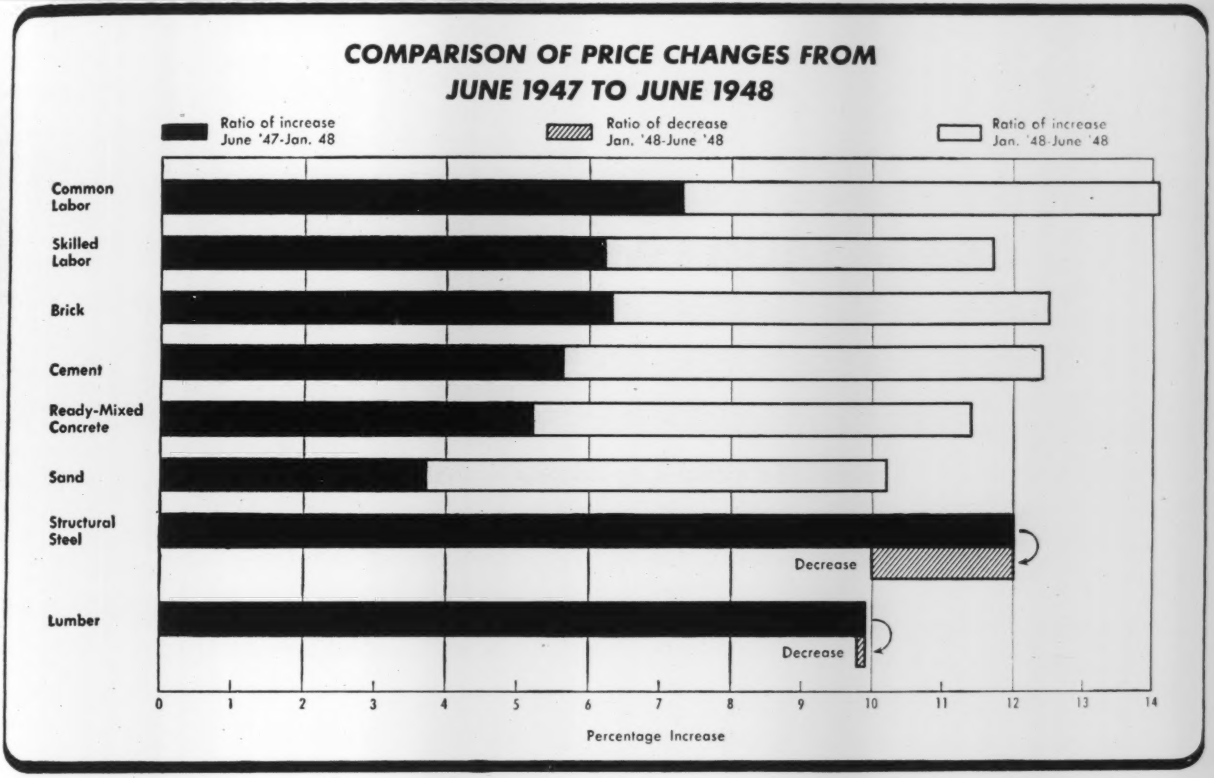
CONSTRUCTION TRENDS



COMPARISON OF PRICE CHANGES FROM JUNE 1947 TO JUNE 1948

Rise in Material and Labor Costs Slows Down

The rise in basic construction materials prices and wages slowed down in the first half of this year, compared with the last half of 1947. The wages of common labor, as measured by *Engineering News-Record's* 20-cities average, rose 14.1 percent from June 1947 to June 1948, but less than half of this gain, or 48 percent, was in 1948. Skilled labor wage rates rose 11.7 percent in the past year, with 47 percent of this rise occurring in the 1948 period. Only 12 of the 20 cities, however, have reported gains so far this year.

Steel and lumber prices showed declines in the January-June 1948 period of 2 percent and 0.1 percent, respectively. This compares with an increase in the second half of last year of 12.0 percent in the base price of structural steel and 9.9 percent in wholesale lumber prices, as measured by *Engineering News-Record's* 20-cities average of pine and fir. Brick prices, rising 12.5 percent in the past year, showed approximately the same increase in both the first and last half of the year.

Cement, sand and ready-mixed concrete, however, showed greater gains in the first half of 1948 than in the last half of 1947. Cement prices rose 12.4 percent in the past 12 months, but nearly 55 percent of this rise took place in the last 6 months. Ready-mixed concrete prices rose 11.4 percent for the year, with 54 percent of the increase occurring in the 6 months of 1948, and sand prices, 10.2 percent, with the last 6 months accounting for 64 percent of the rise.

Although lumber prices have shown the smallest gain in the past year, 9.8 percent from June 1947 to June 1948, the 20-cities average of $92.05 per M ft. bm for this June is 194 percent above the 1939 yearly average of $31.26. Comparable 1939 figures are available for only four of the eight prices discussed herein. *Engineering News-Record's* common labor average of $1.352 per hour in June 1948 is 98 percent greater than the 1939 average, the skilled labor average of $2.25 per hour is 56 percent greater, the base price of $2.75 per cwt. for structural steel is 33 percent greater.

With the break in the "no wage increase" holding line in the automobile and other major industries, greater pressure for increased wages may be felt in the steel industry which in turn could be reflected in future increased prices for steel.

The cost of cement to consumers in some areas may also show some rise as the result of the recent Supreme Court decision affecting the cement industry's multiple basing point pricing system. Cement companies are no longer able to quote destination prices. Thus, the local competitive price pattern has been destroyed, and price increases in some areas are expected.

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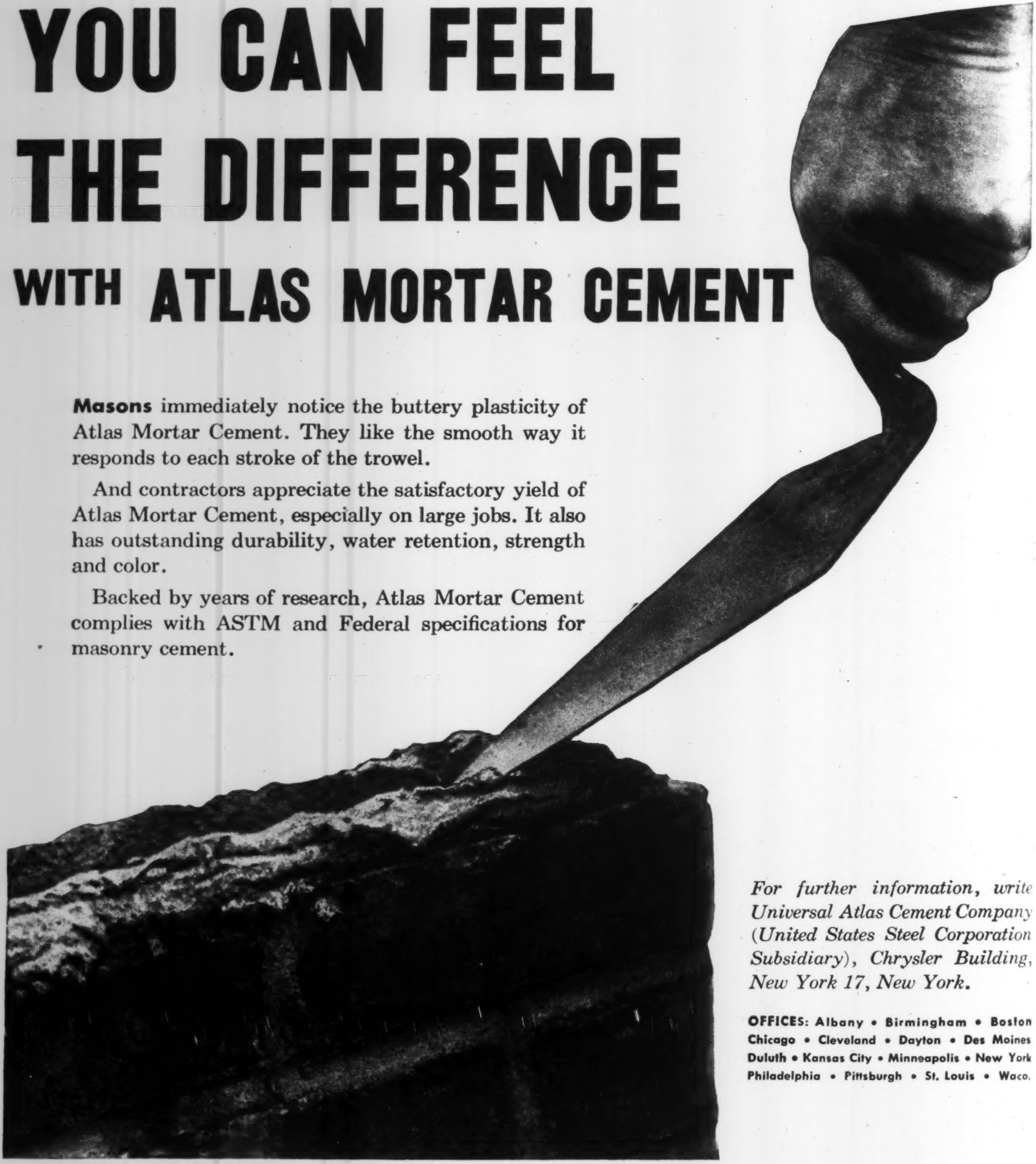

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News of the Week

ENGINEERING NEWS-RECORD • JUNE 24, 1948 • VOLUME 140 • NUMBER 26

$1.2 billion for building as Congress ends session

Construction funds approved as 80th Congress ends give highway work, Army building, flood control greatest total—Major appropriations listed.

Congress appropriated nearly $1,200,000,000 and authorized more than $2,000,000,000 for construction during the final days of the session that closed June 19.

Biggest appropriations in the construction field go for: Highways, $1,040,000,000; military public works, $515,000,000; flood control, $466,000,000; hospitals, $335,000,000; atomic energy facilities, $300,000,000; rivers and harbors, $200,000,000.

A detailed review of the new federal construction funds and related legislation will appear next week. Briefly Congressional action earmarked construction money for a dozen classes:

Highway funds—A compromise between the House and Senate on H. R. 5888 resulted in these authorizations for each of the two years, fiscal 1950-51: $450,000,000 of federal aid to be matched on a 50-50 basis by the states; $25,000,000 for forest highways; $17,500,000 for forest development roads and trails; $10,000,000 for national park roads; and $10,000,000 for parkways and access roads. Additionally, the Agriculture appropriation bill (H. R. 5883) provides about $15,000,000 for forest highways and roads in fiscal 1949, and the National Park Service receives for fiscal 1949 an allocation of $3,110,000 for roads and trails in the Interior appropriation bill.

Reclamation—An Interior Department Appropriation bill (H. R. 6705) for some $400,000,000 (a compromise about halfway between the House and Senate figures) carried close to $240,000,000 for the Bureau of Reclamation. Of this amount, roughly $140,000,000 goes to the general construction fund, including $54,786,650 for the Missouri River Basin and more than $40,000,000 for the Central Valley Project.

Flood control and navigation—The Army Civil Functions Bill (H. R. 5524) appropriates $404,741,000 for flood control and $166,989,100 for rivers and harbors in fiscal 1949. An authorization bill known as the Flood Control Act of 1948 (H. R. 6419) approves for future construction more than $30,000,000 for river and harbor improvements and about $62,000,000 for flood control.

Atomic energy—The Independent Offices Supplemental Appropriation Bill (H. R. 6829) for fiscal 1949 granted more than $500,000,000 cash and $400,000,000 contract authorization to the Atomic Energy Commission. Estimated obligations to be incurred for construction activities by the AEC in fiscal 1949 total nearly $300,000,000.

Stream pollution—Congress passed a bill (S. 418) instituting new water pollution control activities in the U. S. Public Health Service and the Federal Works Agency, corresponding generally to the House-amended version of the Senate measure (*ENR* May 6, vol. p. 676). The bill as passed authorizes $22,500,000 a year for five years to make loans to states or municipalities for treatment works; $1,000,000 a year to be paid to the states for use in surveys and studies; $800,000 a year for additions to the Cincinnati laboratories of PHA; $1,000,000 a year for grants to help finance the planning of pollution control facilities; and funds up to $2,500,000 a year to pay federal administrative expenses.

Military construction—Two authorization bills, one for the Navy (S. 1675) and the other for the Army and Air Force (S. 1676) approve $417,600,000 for military public works. The Navy bill authorizes $92,932,600 of construction in the continental United States and $116,756,900 overseas by the Bureau of Yards and Docks. The Army-Air Force measure sets up $85,866,000 in this country and $122,044,350 outside the continental United States for the Corps or Engineers.

In the second deficiency appropriation bill (H. R. 6935) as written, the Bureau of Yards and Docks was to get

(*Continued on page* 59)

Housing starts hit boom time stride

Starts of new housing units in the United States were approaching a boom level in May, the Bureau of Labor Statistics reported last week. Housing starts recorded by agency were 97,000 for the month of May—an all-time record figure.

To date, the agency has recorded a total of 356,000 housing units started in the first five months of 1948, and agency statisticians clung to their prediction of January that the total housing for 1948 would be more than 970,000 units. In 1947, best housing year since 1927, total units were about 850,000.

By months, BLS statistics show the following starts for this year: January, 50,000; February, 47,200; March, 70,000; April, 90,000. The pace is said to be 25 percent ahead of 1947.

The record house building rate was reflected in *Engineering News-Record's* tabulations of engineering construction awards, which were 27 percent ahead of 1947 before the end of May.

Greatest reflection of the housing boom was apparent in an 84 percent increase in waterworks and a 96 percent increase in sewerage works.

At the same time this magazine's tabulation of construction costs showed that costs almost levelled off from December, 1947, through April, 1948, in fields where common labor predominates, and through May where skilled labor prevailed. By June, however, wage increases averaging 13 percent were in force in twelve of the twenty cities covered for the construction cost index, and the index itself had risen 15 points over December, 1947.

NEWS IN BRIEF

In telegraphic form, here are latest news developments on the engineering and construction front during the week.

Public Construction—*Gulfport, Miss.*, plans to build a 100-bed hospital to cost about $1,000,000. . . . A $4,000,000 Veterans hospital will be erected southwest of *Decatur, Ill.* . . . The Joint Hospital Survey and Planning Commission has recomended a $750,000,000 long-range program to coordinate and expand hospital facilities in *New York State*. . . . Work will start within a year on the first unit of the new *Boston, Mass.*, Museum of Science atop the Charles River Dam. . . . Board of Public Works, *Seattle, Wash.*, will take bids till July 15 on a 15-story $5,000,000 public safety building. . . . Excavation for the new $1,700,000 Oregon state office building in *Salem* began recently, and Sound Construction and Engineering Co., contractors, estimate that it will take 18 months to complete. . . . Work may start next year on a $10,000,000 hospital at the University of Washington, *Seattle*.

Industrial Construction — International Harvester Co. will build a large parts distribution depot in *Broadview* (a Chicago suburb) to cost an eventual $7,000,000. . . . Atlas Imperial Diesel Engine Co. has projected a $1,000,000 plant at *Hayward, Calif.* . . . Henke & Pillot, Inc., a supermarket chain, has a $2,188,000 construction program under way at *Houston, Tex.* . . . A $5,000,000 steam plant northeast of *Sioux Falls, S. D.*, has been nearly completed by the Northern States Power Co. . . . Wm. A. Smith Construction Co., Houston, holds a $1,000,000 contract to build the 17-mi. Point Comfort and Northern Railroad, to serve the proposed $50,000,000 Aluminum Co. of America plant at *Port Lavaca, Tex.* . . . Humble Oil & Refining Co. is taking bids on a $1,000,000 research building at *Baytown, Tex.*

School Construction—The planning and development committee of the University of *Pittsburgh, Pa.*, has announced a $16,250,000 long-range building program. . . . An $880,000 program to repair 18 schools in *Binghamton, N. Y.*, has been submitted to the board of education. . . . Construction of a $1,000,000 seminary building at St. Bonaventure College, Olean, N. Y., will start this year.

Housing—*Paris, Ont.*, is selling lots at one dollar each to veterans who want to build homes within a year. . . . Post Oak Plaza, a $1,900,000 project of 120 homes at *Houston, Tex.*, will be built by the Bell-Tex Corp. . . . Initial excavation on a $1,500,000 housing project in *Butte, Mont.*, has started as the Butte Development Association began operations on construction of 175 new homes.

Highways—The Oklahoma and Texas highway bureau have agreed to build a bridge across the Red River, south of *Millerton, Okla.* . . . Bids will be sought in August for the $6,000,000 Alaskan Way viaduct at *Seattle, Wash.* . . . A $7,500,000 five-year highway reconstruction and surfacing program has been recommended to *Providence, R. I.*, by Andrew & Clark, New York engineers. For 1948 a total expenditure of about $3,000,000 is advised, followed by smaller outlays down to less than $1,000,000 in 1952.

Water Supply and Sewers—*Forest City, N. C.*, will issue $500,000 bonds for a new water system. . . . Bids are being received for a sewage disposal plant at *Hanford, Calif.* . . . Water rents in *Philadelphia, Pa.*, may be increased 50 percent to make available about $5,000,000 to continue the water improvement program . . . *Houston, Tex.*, has approved plans for sewage dewatering and drying equipment to cost $588,000.

Miscellany—Construction of an extension of the Washington Street subway in *Boston, Mass.*, to Dudley Street in *Roxbury*, and of a second tube between Park Street and Scollay Square subway stations, was recently approved by the Massachusetts House of Representatives. The project will cost about $30,000,000. . . . Legislation to speed up construction of tax-free garages or off-street parking facilities in *Boston* was recently enacted by the state legislature. The proposal would permit the city to lease property for 40 years to persons who will guarantee to build accommodations for at least twice as many cars as could be parked on the ground in the same area. . . . Recent complaint by civil engineers employed on *Indiana* state highway jobs of low salaries in comparison with similar employment on federal jobs and in private industry were met by statements of members of the State Highway Commission that publicly employed civil engineers "cannot expect the same salary level paid private industry jobs in boom times."

◆

Schuylkill cleanup to start in July

Pennsylvania's long-range job of cleaning up the Schuylkill River—eventually a $52,000,000 project—will begin during July with dredging operations, Milo F. Draemal, Secretary of Forests and Waters, said recently. The job will be done with four electrically-operated dredges. Construction of several small dams will be necessary.

Civil defense body names engineering aides

The newly-formed office of Civil Defense Planning last week announced the appointment of three engineering aides. This virtually completes its organization. The agency is charged with developing plans for civil defense in the United States and the program of legislation looking toward establishment of a permanent agency capable of expansion in event of an emergency.

Appointed as consultants on engineering were Harold A. Kemp, of Arlington, Va., sanitary engineering director for the District of Columbia; and Walter D. Binger, of New York City. William D. Wrightson, of Chevy Chase, Md., has been named engineering assistant to the office.

Mr. Kemp will act as consultant in developing specifications for such programs as sanitation, water purification, and other related activities. Mr. Binger will act as a consultant for the technical division. Mr. Wrightson, a widely known sanitary engineer, will devote himself to sanitary engineering matters.

Wiltsee, chief engineer, N. & W. Ry., retires

W. P. Wiltsee, 70, chief engineer of the Norfolk & Western Ry. since 1924, and long an authority on railroad engineering has retired after 47 years of service with that railway. Mr. Wiltsee is succeeded by Arthur B. Stone who had been assistant chief engineer. Among the changes following Mr. Stone's promotion are these: W. L. Young, principal assistant engineer, becomes assistant chief engineer; James Y. Neal, assistant engineer at Norfolk, Va., becomes principal assistant engineer at Roanoke, Va.; John F. Newsom, Jr., assistant engineer of buildings at Roanoke succeeds Mr. Neal as assistant engineer at Norfolk; Charles E. Lex, Jr., a draftsman, has been advanced to assistant engineer of buildings.

Mr. Stone, 58, began his career in 1906 with the Virginia Bridge & Iron Co., and went with Milliken Brothers, Staten Island, N. Y., in 1910 and with Post & McCord, New York, in 1911. He joined Norfolk & Western as a bridge draftsman in 1942.

Interior appropriations bill carries ouster of reclamation bureau chiefs

Rider on conference-approved bill would cutoff pay of non-engineers in top administrative jobs.

The Interior Department Appropriation Bill (H. R. 6705), approved as Congressmen wound up their sessions last week, carried with it the controversial rider aimed at ousting Michael Straus from his post as commissioner, and Richard Boke as regional director for the Bureau of Reclamation.

The Senate had passed its version of the rider by voice vote two weeks ago, after receiving a similar bill from the House. The rider was then submitted to a conference committee to iron out the slight differences.

The ouster provisions in both versions of the bill were closely parallel, and at week's end it was reported that conferees had reached an agreement on the wording. The committee version will accomplish the virtual discharge of the two men by a requirement that "no salaries be paid to a commissioner, assistant commissioner or regional director" of the Bureau of Reclamation who is not a qualified engineer with a record of five years of engineering and administrative experience.

The implication is plain—Congress is determined to disqualify the two incumbents.

Congressional effort to dislodge Straus and Boke had been under way for some time (*ENR* May 27, vol. p. 763, and June 3, vol. p. 917). Senator Sheridan Downey of California had led an attack charging misuse of Reclamation funds for propaganda. Interior Department officials headed by Secretary J. A. Krug had countercharged that the attack was really an attempt to break down the Reclamation Law for the benefit of large landowners in California's Central Valley by circumventing the stipulation that no farm larger than 160 acres shall receive federal irrigation water. The Department further contends that the legislative rider aimed at the two Reclamation executives is actually a bill of attainder and is therefore unconstitutional.

House adds ouster rider

After the House Appropriations Committee had refused to put the "engineer" restriction in the original Interior Department bill, the House added it by amendment on the floor. With slight changes, the Senate Appropriations Committee passed a similar limitation. Two members (Senators Hayden and O'Mahoney) issued a minority report objecting to the proviso. On the Senate floor, Senator O'Mahoney was the only one of the 34 senators from the 17 western states to speak against it.

The House amendment required ten years engineering-administrative experience and orders non-payment of salary after July 1, 1949. In the Senate version, the requirement was five years and payment stops Jan. 31, 1949.

Commissioner Straus has a reputation as a fighter. He is not the kind of man to quit under fire. His planned course of action is: (1) to hold a week's meeting at Grand Lake, Colo., starting July 12, of principal Reclamation engineers and regional directors to plan for fiscal 1949 the largest construction program in reclamation history; (2) to study the election returns on Nov. 2; and (3) to consider then whether to ask the Supreme Court to pass on the constitutionality of the restriction in the Congressional bill. Lawyers who have previously won bill of attainder actions before the Supreme Court have told him that the provision is unconstitutional.

Lake Erie-Ohio River Canal report approved

The Army's Ohio River division engineer has approved a review report on a proposed 104-mile canal to connect Lake Erie and the Ohio River—latest in a series of such proposals, first broached in 1912.

The latest proposed 18-ft. canal has an estimated first cost of $439,000,000, of which approximately $23,000,000 would be supplied by local interests affected.

The course of the canal, along the Beaver and Mahoning Rivers, would be from Rochester, Pa., on the Ohio to Beaver Falls, Pa., and then to Newcastle, Pa., and Youngstown, Ohio. From Youngstown the canal would touch Niles, Warren, Farmington, Jefferson, and Ashtabula. A summit cut through the divide between the Grand Basin and the Mahoning would permit access from the Mahoning to the north slope. A dam near Harpersfield, Ohio, would provide a navigable reservoir in the Grand Basin.

The proposed canal would have a minimum bottom width of 226 ft. Other provisions would include a harbor suitable for lake and river vessels immediately west of the present Ashtabula Harbor on Lake Erie.

Approve $1.2 billion for building

(Continued from page 57)

$48,000,000 cash and $50,000,000 contract authorization for public works.

Veterans hospitals—In the Supplemental Independent Offices Appropriation Bill for 1949 (H. R. 6829) the Veterans Administration received $202,000,000 in cash and $43,000,000 in contract authority for hospitals and dormitories.

Aid to hospitals—An appropriation bill (H. R. 5728) signed by the President June 14, carried a provision of $60,000,000 in appropriated funds and $75,000,000 in contract authorization to enable the hospital grant-in-aid program to the states to move forward at the full authorized rate of the Hospital Survey and Construction Act.

Federal buildings—During its various stages in the last days of Congress, the Second Deficiency Appropriation Bill authorized three federal buildings for erection in the District of Columbia: A new Senate office building to cost $20,000,000; a general accounting office, $22,850,000 (with $5,000,000 in cash available from previous appropriations to start the work); a federal courts building, $1,000,000 appropriated of $14,875,000 for contract obligation.

Tennessee Valley—In the Government Corporations Appropriation bill (H. R. 6481) the Tennessee Valley Authority was scheduled to receive $15,142,000 for construction of Watauga and South Holston dams, but Congress denied TVA a $4,000,000 appropriation for a new steam generating plant.

Public airports—For construction of public airports in Alaska, the Second Deficiency Appropriation Bill (H. R. 6935) proposed to give the Civil Aeronautics Administration $3,000,500 cash and $9,000,000 in contract authority. Previously, by P. L. 597, signed June 3, CAA had received appropriations of $3,000,000 for the federal-aid airport program and $1,835,000 for construction at Washington National Airport.

Housing—A last-minute housing bill established a secondary market for G. I. home loans in the Reconstruction Finance Corporation but touched none of the controversial issues, such as public housing and slum clearance, contained in earlier bills.

ASEE hears discussion of improved teaching

Fifty-sixth annual meeting of American Society for Engineering Education closes five-day session at University of Texas

Nearly 1,100 engineers and educators representing the engineering profession in the United States and eleven foreign countries closed a five-day series of meetings at Austin, Tex, last week after hearing talks urging the broadening of the engineers' educational base.

The occasion was the 56th annual meeting of the American Society for Engineering Education, held at the University of Texas. The group chose C. J. Freund of the University of Detroit as president, succeeding Charles E. MacQuigg of Ohio State University; Thorndike Saville of New York University was elected a vice-president.

A majority of the speakers concentrated their talks on the need for broadening the aducation of young engineers. John C. Park of the University of Arizona criticized current proposals for a four-year pre-engineering training program with the statement that a high school graduate intent on an engineering education should concentrate on engineering subjects for the first two years in college, then broaden out into English, economics and similar subjects in his last two years. Other speakers before the various sections discussed the value of summer surveying camps; the need for specialized training of sanitary engineers in bacteriology, chemistry and other subjects; the demand for specialized courses in highway safety, and the need for expansion of college placement services.

A committee headed by G. H. Dunstan of the University of Alabama recommended that courses in fire prevention should be introduced either as separate elective courses or through information introduced in regular courses.

Officers and awards

In addition to the new president and vice-president, other officers named were: J. S. Thompson, McGraw-Hill Co., re-elected treasurer; F. M. Dawson, University of Iowa, re-elected president of the Engineering College Research Council; and L. O. Stewart, of Iowa State University, new chairman of the Civil Engineering Section.

Awards presented included: The George Westinghouse Award, to Hunter Rouse, professor of fluid mechanics, University of Iowa; and the Lamme Gold Medal to Alexander Graham Christie, of John Hopkins.

Next convention will be at Rensselaer Polytechnic Institute, Troy, N. Y.

Plan shifting channel of Atchafalaya River

The Vicksburg, Miss., division office of the Corps of Engineers has approved a $3,300,000 project to relocate the navigation channel of the Atchafalaya River from a point near Morgan City, Miss., to the Gulf of Mexico.

The present 200 ft. wide, 20 ft. deep channel runs through Atchafalaya Bay to the Gulf. Under the proposed project, a channel would be dredged through land east of the bay.

The proposed project, as approved by the district and division engineers, provides for a land-locked channel 15 ft. deep and 125 ft. wide east of the bay.

◆

E. St. Louis puts up fund for bridge approaches

The City of East St. Louis, Ill., said last week it had deposited $500,000 in an escrow fund to guarantee construction of adequate traffic facilities at the western end of the proposed bridge to be built across the Mississippi River between Third Street and St. Louis Ave., East St. Louis, and a point near Third St. and Franklin Ave. in St. Louis, Mo.

A deposit of funds to guarantee construction of a proper western exit for the vehicular deck of the bridge was required by the St. Louis, Mo., board of public service before it would give official approval to plans for the bridge.

Construction contract for the bridge was awarded two weeks ago to William J. Howard, Inc., 35 E. Wacker Drive, Chicago, on a bid of $6,490,000.

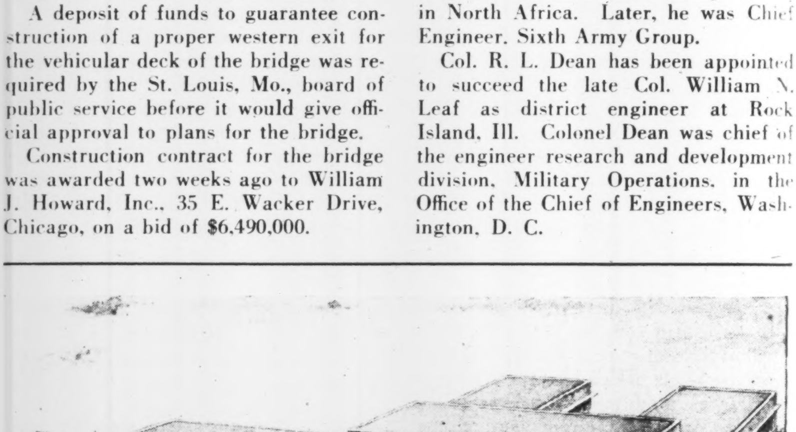
New district engineers appointed for 2 offices

Two new district engineers have taken over the responsibilities of the district offices in Washington, D. C., and Rock Island, Ill., for the Corps of Engineers, U. S. Army.

Col. Henry C. Wolfe of Washington, D. C., has been appointed district engineer, Washington district, to succeed Capt. John W. Califf, acting district engineer. Colonel Wolfe will have charge of all work in connection with rivers, harbors and flood control in the district, comprising the drainage areas of the Patuxent, Potomac and Rappahannock rivers, all military construction in Maryland, Pennsylvania, West Virginia, Virginia, and the District of Columbia, and the Washington Aqueduct.

A graduate of Bucknell University and of the Command and General Staff School at Fort Leavenworth, Kan., Colonel Wolfe has served with the Army Engineers since 1917. He was with the 535th Engineers in France during the first world war, and with the 3rd Engineers in Hawaii from 1935 to 1937. During world war II, with the rank of brigadier general, he commanded the invasion training center, in North Africa. Later, he was Chief Engineer, Sixth Army Group.

Col. R. L. Dean has been appointed to succeed the late Col. William N. Leaf as district engineer at Rock Island, Ill. Colonel Dean was chief of the engineer research and development division, Military Operations, in the Office of the Chief of Engineers, Washington, D. C.



FOR WORKER HEALTH—A new clinic now under construction at Talara, Peru by the International Petroleum Co., Ltd., is large enough to serve the entire 15,000 population of the town. The brick, metal, wood and concrete structure was designed by Crow, Lewis and Wick of New York City; and extensive wood work—specially termite-proofed—was built by Nuroco Woodwork of New Rochelle, N. Y.

Engineers study China reconstruction

Four engineers, one of them a former president of the ASCE, left the U. S. for China last week as members of a survey group for the economic cooperation administration to study Chinese reconstruction projects.

The eleven-member group will inquire into steps that could be taken to restore essential transportation facilities; develop sources of fuel, power, export industries, and coal mining, and to improve port facilities. Following its study, the group will recommend priority of construction of projects which would contribute most to the improvement of economic conditions in China. This report is expected to be made about August 1.

The four engineer-members of the survey party are: Edgar M. Hastings, Richmond, Va., who will serve as transportation engineer of the survey; Paul R. Paulick, Library, Pa., mining engineer; Charles A. Powel, East Pittsburgh, Pa., and J. D. Whittemore, New York, electric utility engineers.

Mr. Hastings is chief engineer of the Richmond, Fredericksburg & Potomac Railroad Co., and was president of the American Society of Civil Engineers in 1947.

Mr. Paulick, a consulting engineer, was formerly general manager of the Hellier Coal and Coke Co., Pittsburgh, and was connected with other coal companies as mining engineer. Mr. Powel, who will be concerned with power plant capacities and power distribution for China, is assistant to the vice president in charge of engineering for the Westinghouse Electric Corp., and was resident engineer in Japan for Brown, Boveri and Co. from 1911 to 1915. Mr. Whittemore is vice president of the Chase National Bank and prior to that had long experience in the public utility field.

Large task

The task before the group is an extensive one. China urgently must take steps to restore essential industry in areas sheltered from military operations. Projects such as those for the expansion of electric power capacity, particularly in the Shanghai area, for the rehabilitation of railroad transportation in South China, for the development of coal mining in Central and South China, and other projects, all are necessary to enhance the nation's productive capacity and improve her foreign exchange position.

The survey party must take into account the changes in costs and prices, engineering feasibility, relative importance to the economy, and economic soundness of the projects, as well as the availability of materials and equipment to be procured in the United States. There are a number of projects of high priority from the standpoint of China's basic reconstruction needs which are worthy of consideration in allocation of funds that congress may appropriate.

Three major reconstruction projects have been under careful study for some time: installation of a centralized 100,000-kw. generating station for the Shanghai area, to cost about $20,000,000; reconstruction of the 795-mile Hankow-Canton-Kowloon railroad, estimated in 1946 to cost $61,300,000; and rehabilitation of the Western Kiangse coal mines.

Survey Korea power

The Department of the Army announced it is ready to conduct a study of the emergency power situation in South Korea.

The department said that Carl H. Giroux of the Corps of Engineers heads a survey group of seven U. S. engineers who left Washington last week for Seoul, Korea.

The group includes Clarence G. Bolick, electrical engineer for the Duquesne Light and Power Co., Pittsburgh, Pa.; Hollis N. Hugins, electrical engineer for the Connecticut Power and Light Company, Devon, Conn.; Edwin Rall, formerly with the Detroit Edison Co.; George D. Roberts, hydraulic engineer for the Corps of Engineers, South Pacific Division, Oakland, Calif.; H. H. Spencer, president, Pioneer Coal Mining Co., Pittsburg, Kan.; and Commander E. D. Sykes, of the Bureau of Yards and Docks, U. S. Navy.

The group will study methods for increasing the power output of existing hydro and steam electric power generation facilities.

◆

Plan $9 million Canadian reclamation program

A $9,000,000 program for rehabilitation of 80,000 acres of water-logged farm lands in the Maritime Provinces of Canada was outlined in the House of Commons recently.

Agriculture Minister Gardiner said that the program involves the building of dikes and other protective works to reclaim useful farm lands from the sea in the low lying coastal areas of Nova Scotia, New Brunswick and Prince Edward Island. Most of the area lies at the head of the Bay of Fundy where the highest tides in the world make reclamation a costly but practical proposition.

The Dominion government is to supply $3,210,000; the provincial governments, $4,230,000, and land owners concerned, $1,440,000.

The reclamation program may last from five to ten years, depending on the speed at which it proves possible to carry out the work.

The Dominion's share of the cost is to take care of the work required to keep the sea out of the reclaimed area.

ALSO RECORDED . . . . .

Planetary radiations are said to reveal that "highways of a rich wine color" would reduce traffic accidents, members of the Society of Allied Sciences were told at San Diego, Calif. Speaker was Corrine Dunklee Heline, a "color and music therapist" of Los Angeles.

And Utah professional engineers heard that "the compatability of music and science" is closer than appears on the surface. Mrs. Royden J. Keith, president of the National Federation of Music Clubs, added the thought that "engineering is the warp and woof of everything." She was elected an honorary member of the Utah group.

Clifford Wood, a native of Protem, Mo., is now secretary of the Missouri Society of Professional Engineers. A full-time, not a temporary appointment, it appears.

Logical Development Note: A member of the California Water Resources Board has recommended creation of a state agency to license air-borne rainmakers.

Determined to end traffic law violations, Chillicothe, Ohio, installed parking meters recently—then had to remove 30 of them. The offending meters were found to be placed in violation of the state traffic code—too close to intersections.

Far from their ancestors' forests, some 1,000 Mohawk Indians have established themselves in deepest Brooklyn, N. Y., from which location these braves sally forth daily as ironworkers on New York's tall buildings. A bridge built four generations ago by their forebears, to connect a reservation with Montreal, Canada, started tribesmen in this vocation.

NLRB takes construction jurisdiction

For the first time where the issue was contested, National Labor Relations Board members have voted to assert jurisdiction over the construction industry.

Since the Taft-Hartley law became effective a year ago, NLRB General Counsel Robert N. Denham has assumed jurisdiction in a number of construction industry cases, particularly where secondary boycotts were involved.

In ordering an election asked by the AFL Building Trades Council this week among employees of Ozark Dam Constructors of Houston, Tex., the board itself has for the first time expressed itself on the question of whether it has jurisdiction over a project that is under construction.

The board indirectly took jurisdiction in another construction case in April when it determined the proper bargaining unit for Technical Engineering Employees and Inspectors of Starrett Brothers & Eken, Inc., on the Peter Cooper Village project in New York. In that case, however, the dispute was over the unit, not over jurisdiction. In the subsequent election, the engineering employees and inspectors voted 20 to 4 in favor of representation by the AFL's Architectural & Engineering Guild, Local 66.

The Ozark Dam Constructors is a joint venture of nine companies organized to build Bull Shoals Dam on the White River watershed in Marion and Baxter counties, Arkansas. The total contract price of the project is $22,000,000. Total cost of the dam, including materials furnished by the federal government, will be $37,000,000.

The dam is part of a flood control and electrical power development project of the War Department. The entire project will cost an estimated $69,000,000.

The contractors, relying on NLRB's refusal in the past to take jurisdiction over the construction industry, contended that they were not engaged in interstate commerce within the meaning of the Taft-Hartley Law.

The board unanimously rejected this argument. It pointed out that, aside from the fact that construction of a dam for flood control and generation of electric power has a greater impact upon commerce than construction of buildings, the board has always held that its jurisdiction extends over construction projects "if their interrupton would affect interstate commerce."

The board added that its abstention from exercising jurisdiction in the past was because of "administrative choice" rather than "legal necessity."

It threw further light on how it will approach the jurisdiction issue in the construction industry in stating:

"The law gives us jurisdiction in all situations where stoppage of production due to a labor dispute would affect interstate commerce. It has been held immaterial whether that stoppage occurs at the beginning or the end of the interstate shipment of goods in commerce."

In other words, a contractor does not himself have to be "engaged" in interstate commerce. The test is whether a stoppage of his activity will "affect" interstate commerce. The board will not, however, assert its jurisdiction in all cases which meet this broad test. It can be expected, by choice, to select only those where a stoppage would have a major affect on commerce or where the issue involved warrants board action, as in a secondary boycott.

◆

New strikes, settlements listed by building labor

Labor news during the week was almost evenly divided between settlement of disputes and new strikes, mostly aimed at obtaining higher wages.

On the side of settlements of labor disputes, these agreements were reported:

A 10-day strike of 7,000 AFL Building Trades Workers, Atlanta, Ga., was settled when the men accepted wage increases of 10 and 12½ cents an hour, effective until next January 1, when a similar boost will go into effect; building unions at Minneapolis, Minn. signed a new wage agreement with contractors providing for increases of from 15 to 27½ cents an hour; a 20 cent per hour wage increase granted to painters in Erie, Pa., was hailed as the first step toward ending a four week work stoppage in the Erie area; an NLRB-conducted election certified as representative for technical and engineering employees and inspectors of Starrett Brothers & Eken, Inc., New York the Architectural and Engineering Guild, Local 66, International Federation of Technical Engineers, Architects and Draftsmen.

On the debit side, the following new work stoppages were reported:

Three thousand operating engineers at Philadelphia, Pa., went on strike to tie up an estimated $250,000,000 building program in a wage dispute; some 2,100 hodcarriers and building laborers struck for higher wages in Cincinnaii, Ohio; Phoenix, Ariz., contractors representatives of some 5,000 buil workers began negotiations on the w ers' demands for 20 cents per hour w increases.

At Jefferson City, Mo., the state preme court upheld the right of AFL Building and Construction Tra Council to picket homes being built a St. Louis county contractor with non-union labor. The decision affirmed a previous ruling by the circuit cou after the contractor had charged th the labor union was operating in re straint of trade, and that there was n dispute between itself and its own em ployees.

◆

George A. Soper dies sanitation leader

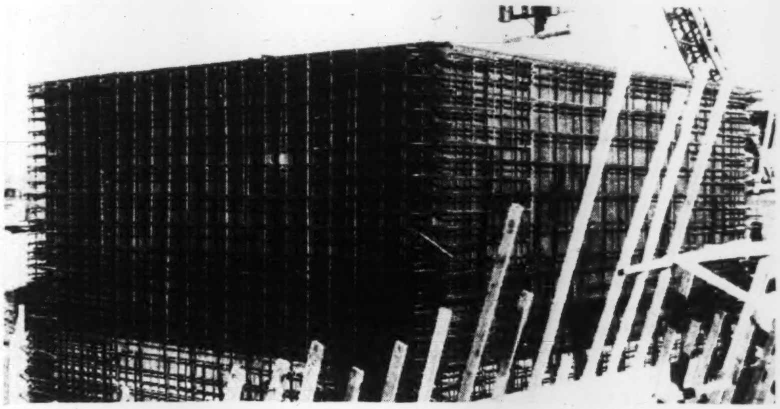
George A. Soper, a sanitary engineer whose wide range of professional activities were exceeded only by his showmanship in directing attention to public health problems, died last week in Southampton, L. I. at the age of 78.

Dr. Soper received world-wide attention in 1904 when he tracked down a chronic typhoid carrier, a woman cook who was found responsible for causing 54 cases of disease and four deaths. This dramatic discovery of a person who carried the disease, but was not herself afflicted by it, came about through his investigation of a typhoid epidemic in Oyster Bay, L. I. Typhoid Mary, as the woman later became known, was confined to an isolation hospital until her death in 1938.

His interest in typhoid-fever control, on which he was consulted as an expert, originated with Dr. Soper's early experience as an engineer for the Cumberland Mfg. Co. of Boston, builders of water filtration plants.

In 1906, he headed a commission investigating air pollution in New York subways, which resulted in ventilation improvements. As a member of the Metropolitan Sewerage Commission from 1906 to 1914 he played a major role in defining a disposal program. In later years he devoted his attention to many other aspects of environmental sanitation, particularly refuse disposal and street cleaning.

A graduate of Rensselaer Polytechnic Institute in 1895, he received his doctor's degree from Columbia University in 1899. From his earliest experience as sanitary engineer in the rehabilitation of Galveston following the storm of 1900, until his retirement in 1944 when he was consultant to the U. S. Housing Authority, Dr. Soper was one of the most colorful protagonists of the sanitary engineer as a guardian of the public health.



GLASS INSULATION in block-form lines the interior digester walls of the Ephrata, Wash., sewage treatment plant. The blocks were fastened to the inside forms before concrete placement.

Sludge digester insulated with glass

In what is probably the first application of insulation inside a sewage digester, glass insulation in block form is being used to line the primary digester of the Ephrata, Wash., sewage treatment plant now under construction.

According to the engineers, the complete impenetrability of the material—Pittsburgh Corning's Foamglas—makes such a lining possible. The ease of installation and permanence when installed make it practical.

The blocks are 12x18x2 in. and have a thermal conductivity coefficient of about 0.40. Their use is intended to retard heat transfer from digesting sludge.

Construction was relatively simple: The insulation was fastened to the inside forms by 8d. nails. A few cracked blocks resulted but not enough to be considered serious. Six brass rods, each $\frac{1}{8}$x5 in., were pushed into each block at varying angles to provide bond with the concrete.

BRASS RODS, $\frac{1}{8}$x5 in., stuck into the blocks at various angles embed themselves in the concrete to tie the insulation firmly in place.

Vibration of the concrete was done with care to prevent damage to the insulation. No difficulty was encountered in form stripping. The boards pulled away from the blocks easily, leaving the nails in the blocks. After form removal, the entire interior surface was coated with a wax-type hot coating that cooled to form a gas-tight membrane. The coating is able to withstand mild acidic action and temperatures up to 180 deg. F.

This work is part of a 0.8-mgd. primary treatment plant under construction for the city of Ephrata. Arnold Pontius is city engineer. The plant was designed by Parker & Hill, consulting engineers, Seattle, Wash. Contractor on the plant construction was Nyanza Construction Co., Tacoma, Wash.

Construction cost, not including equipment, was $74,719.

◆

Foot-and-mouth disease research lab. planned

The Bureau of Animal Husbandry of the U. S. Department of Agriculture, Washington, D. C., is planning construction of a $25,000,000 laboratory for research work to combat foot-and-mouth disease in animals.

One site under consideration embraces 500 acres on Prudence Island in Narragansett Bay, 10 miles north of Newport, R. I. An infected herd of cattle will be required and since it is a virus disease communicable to men, the department has encountered protests in its search for a site.

Wisconsin home building slowed by high costs

Many Wisconsin builders are cutting back or halting new construction because of their inability to sell completed houses, according to a spot check among builders attending a state builders' conference recently.

Estimates varied as to the number of homes in the Milwaukee area which have been completed but are unsold, but it was indicated that the figure might be about 150. While this was greater than the totals reported from other cities, the problems—principally financing and refusal of prospective purchasers to take the homes—were about the same.

"Builders in Beloit just aren't starting any more homes," said Glenn Webermeier of that city. "We're finishing up what we have. There are about 26 homes completed and unsold in the $10,000 to $12,500 price class. They've been hanging on the market for as long as four months. People are objecting to the price and refusing to buy."

◆

Sewage disposal program set for Vancouver, B. C.

A $1,000,000 program to improve sewage disposal in tidal waters is under way in Vancouver, B. C. The plan was outlined to sanitary engineers at the Canadian Public Health Association's recent annual convention in Vancouver by John Oliver, assistant city engineer for sewers and waterworks.

The program will give Vancouver, with a population of over 350,000, a total of nine pumping stations serving interceptors leading to three major outfalls.

Two pumping stations are now in operation, three more will be completed by the end of the present year, and the balance by 1950.

The purpose is to rid False Creek, a narrow arm of water between downtown Vancouver and residential sections to the south, of sewage contamination. False Creek drains an industrial area which includes a number of sawmills and other plants and has little real tidal movement. A gravity disposal system below the interceptors has so far dumped sewage into the basin with resultant health danger.

An outfall on the south side of the creek, serving the residential areas, provides disposal in tidal waters at 3,300 ft. from shore, depth 50 ft. in English Bay. Salinity content of the water, varying from 40 to 70 percent because of the nearby mouth of the Fraser River, gives a near-maximum sewage dispersal.

Canadians to open new research centers

Governmental and private agencies in Canada have announced plans for two new engineering research laboratories. A third laboratory was opened recently.

The new laboratories will include a service and research center at Toronto, Ont., to be sponsored by the Hydro-Electric Power Commission of Ontario. Bids for a new building were received last week, to include 8,800 ft. of sewers; 15,000 ft. of water main; 5½ miles of road, and railway servicing and other construction details.

At the same time, the Aluminium Laboratories, Ltd., a subsidiary of the Aluminium Ltd., announced it will build a new research laboratory at Arvida, Que., to cost $1,000,000. The company already maintains research laboratories at Kingston, Ont., and Banbury, England. The new unit will concentrate on problems of production of aluminum and other light metals.

Meanwhile, the National Research Council of Canada opened its first regional laboratory on the campus of the University of Saskatchewan at Saskatoon.

To be known as the Prairie Regional Laboratory, the large reinforced concrete and brick building is designed to serve the three prairie provinces of Manitoba, Saskatchewan and Alberta.

It was announced that the building will house, in addition to the Division of Applied Biology, the first building research units of the newly formed Division of Building Research of the National Research Council. Its research facilities for building work will include completely controlled adjoining hot and cold rooms, between which wall sections up to 7 ft. by 8 ft. can be tested for thermal and vapor resistance properties.

◆

Dynamite charge set off by lightning flash

Lightning detonated a charge of dynamite in a Pacific Gas & Electric Co. tunnel project in northern California recently, killing one workman and injuring six others.

Workmen had placed about 50 sticks of dynamite in an explosive pattern at the tunnel face, when lightning struck near the portal. The bolt apparently was conducted by the rails of a narrow-gage railway carrying muck cars and set off the partially prepared charge.

The premature blast took place in an adit of the Rock Creek project in the utility company's $61,800,000 Feather River development.

Court rules parking lot not necessary to a city

A jury in a Michigan circuit court last week returned a verdict against the city of Monroe, Mich., on the ground that a parking lot is not a necessity.

The city had brought a condemnation suit seeking to take two parcels of downtown property for off-street parking purposes. The Monroe Business Men's Association had raised $40,000 by public subscription and the city had appropriated a like amount to obtain the site from nine property owners—all but two of whom had agreed to sell their land along West Front St.

In testimony, the court was told, however, that sale of the property would prevent expansion of long-established businesses and that the proposed lot would have an entrance near a bridge across the Raisin River that would create a traffic hazard.

◆

Indiana war memorial may be started soon

Construction work on the new national headquarters building of the American Legion at Indianapolis, Ind., may start within three months. Trustees of the World War Memorial recently opened six contractors' bids, each below the $2,500,000 the state of Indiana has appropriated for the project.

The state Division of Public Works and Supply is to tabulate bids and recommend award of a contract within 30 days.

◆

Plan river conservation in eastern Ontario

Plans for a river conservation project in eastern Ontario, Canada were laid before representatives of 28 municipal governments in the watershed of the South Nation River meeting at Ottawa recently. The river, the main tributary of the Ottawa between Ottawa and Montreal, drains most of the eastern part of the province.

A million acres is involved in the conservation project, prepared by the staff of the Ontario Department of Planning and Development, under A. H. Richardson, chief conservation engineer. The estimated cost is about $3,000,000. The work would include several storage reservoirs, some river dredging and much conservancy work on the land of the watershed. The municipal representatives constitute the South Nation River Conservation Authority.

Contractor held bound by cost estimate

A contractor who undertakes a project on which he has submitted an estimate is legally bound to complete the work at a cost not exceeding 25 per cent more than the estimate, Superior Judge Arthur E. Graham has ruled at Montesano, Wash.

The ruling arose when Walter J. Loslie of Aberdeen, Wash., sought a judgment against Leonard J. Forrest of Hoquiam, for whom Loslie had built a home. Mr. Forrest contended that the contractor had estimated $500 as the cost of installing an oil-burning heating unit and when the installation cost $957, Forrest refused to pay.

◆

Surveying, mapping group meets in Washington

Mapping the earth's shifting and impermanent magnetism compares to the work of a portrait artist who tries to capture the personality of his subject by integrating various moods and expressions, Comdr. Elliott B. Roberts of the Coast and Geodetic Survey told the eighth annual meeting of the American Congress on Surveying and Mapping in Washington last week.

There are now more than 8,500 places in the United States for which magnetic observations are on file. These magnetic stations serve for testing surveyors' compasses and for compiling the magnetic charts of the Coast and Geodetic Survey, Commander Roberts said. Airborne methods will help greatly to speed up the survey of remote areas, such as Arctic and ocean regions, for which existing data are obsolete and inadequate.

Long-period changes in the earth's magnetism, having a duration of several hundred years, are the most important to the surveyor of the several kinds of variations that occur, he explained. This change complicates the recovery of property lines based on surveys made with compasses many years ago.

Use of a solar eclipse for precise surveying was described by John A. O'Keefe, chief of the research and analysis branch, Army Map Service.

Results of the eclipse observation when finally computed should yield not only better values for certain long distances, and hence for the figure of the earth, but also for the position of the moon in its orbit.

Marshall S. Wright, technical assistant to the chief, office of plant and operations, Department of Agriculture, was reelected president.

OBITUARY

Henry Flood, Jr., 61, Red Bank, N. J., an authority on hydroelectric power plant design an construction, and president of Flood & Watson, died in New York City, June 17. Associated with the late William S. Murray until the latter's death in 1942, Mr. Flood was engaged in the financing, design and construction of the dam and power plant of the Lexington Water Power Co., on the Saluda River in South Carolina. This development contributed to the science of earthen dam construction and was the largest dam of that type in the world when constructed. Mr. Flood had served also as a consultant to many railroads, public utilities and manufacturing concerns. The present firm was formed early this year. His original firm was that of Murray & Flood.

Lewis Y. McConnell, 77, a retired civil engineer of Rochester, N. Y., died June 12. In addition to conducting his own business, he served as a consulting engineer for the city of Rochester for several years.

Harry Waldorf, 62, of Denton, Md., resident maintenance engineer of the Maryland State Roads Commission, died on June 11 in Baltimore, Md. He had completed 40 years of service with the commission on June 1 and planned to retire. A native of Baltimore he became Caroline County roads engineer with headquarters in Denton 35 years ago.

James Davis Cochran, 86, superintendent of the municipal water department at Statesville, N. C., for 44 years prior to his retirement in 1932, died June 9.

Frank J. Zuerner, 57, a construction engineer for Milwaukee County, Wis., died June 11. Formerly he was a construction engineer for Wisconsin and for the city of Milwaukee.

Edmond E. Vogel, construction engineer of Albany, N. Y., died June 10. He was superintendent engineer for R. D. Golden Construction Co., Troy, N. Y., where he had been employed for the last 20 years.

Oscar Edward Meinzer, 71, whose investigations into ground water possibilities in desert areas and arid valleys of the western states led to irrigation projects, died June 14 in Washington, D. C. He had retired in 1946 as chief of the Division of Ground Water after more than 40 years of service with the Geological Survey. He was president of the American Geophysical Union.

William H. Waddell, 65, city engineer and superintendent of the water works department at Owen Sound, Ont., died June 12.

Warren F. Cressman, 76, Norristown, Pa., for the last 28 years engineer of Montgomery County, Pa., died June 5. He was engineer for the Pennsylvania State Highways Department before taking the county post. A graduate of Lehigh University, 1893, he had supervised construction of traction lines in eastern Pennsylvania.

A. J. Anderson, divison engineer of the Chicago, Milwaukee, St. Paul and Pacific Railroad, was drowned in the Pend Oreille River near Ione, Wash., recently when two cars of a freight train plunged into the flooded river and carried Mr. Anderson with them.

◆

Oppose new dams for Tacoma power

The proposal of the city of Tacoma, Wash., to build two hydroelectric dams on the Cowlitz River south of the city has been opposed by the Washington state game and fisheries department on the ground that the river is of great value to the salmon fishery.

Value of fish from the Cowlitz River above the proposed Mayfield dam site is estimated at $551,710 annually. Don Clarke, director of the state game department, said. He declared that the dam would block 1,400 sq. mi. of watershed that includes several important tributaries.

C. A. Erdahl, Tacoma commissioner of public utilities, countered with the statement that power produced from the river would have an annual value of $8.000.000.

MAJOR MEETINGS

American Road Builders Show, Soldier Field, Chicago, Ill., July 16-24.

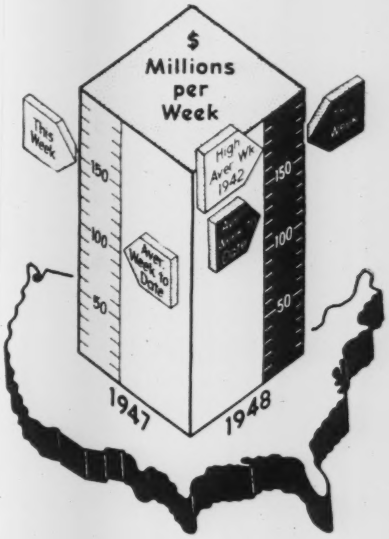
American Society of Civil Engineers, Annual convention, Hotel Olympic, Seattle, Wash., July 21-23.

Oregon Traffic Engineering Conference, Oregon State College, Corvallis, July 29-31.

Regional Surveying Teachers Conference, Green Engineering Camp, Ringwood, N. J., Aug. 26-28.

National Council of State Boards of Engineering Examiners, annual meeting, Hotel Utah, Salt Lake City, Utah, Aug. 27-28.

CONSTRUCTION ACTIVITY



As Reported this week to . . .
Engineering News-Record

CONTRACT VOLUME

Continental U. S. Only
(Thousands of Dollars)

	Week of June 24 1948	Cumulative 1948 (26 wks.)	Cumulative 1947 (26 wks.)
Federal	$15,534	$527,163	$331,938
State & Mun.	48,395	1,181,836	799,492
Total Public.	$63,929	$1,708,999	$113,430
Total Private	96,319	1,624,370	1,542,435
U. S. Total. .	**$160,248**	**$3,333,369**	**$2.673,865**

WHERE CONSTRUCTION ACTIVITY ORIGINATED THIS WEEK

Dollar Volume (Thousands)

Type of Work	This Week	Cumulative 1948 (26 wks.)	Cumulative 1947 (26 wks.)
Waterworks ...	$2,065	$98,463	$55,627
Sewerage	3,834	102,757	64,171
Bridges	5,192	145,858	81,786
Highways	16,487	479,584	378,185
Earthwork, Waterways	9,758	264,575	156,946
Buildings Public	23,700	519,291	252,419
Industrial ...	28,969	521,164	388,629
Commercial .	46,560	964,661	912,168
Unclassified ...	23,683	239,036	383,940

NOTE: Minimum size projects included are: Waterworks and waterway projects, $28,000; other public works, $50,000; industrial buildings, $68,000; other buildings, $250,000.

NEW PRODUCTIVE CAPITAL

	Cumulative 1948 (26 wks.)	Cumulative 1947 (26 wks.)
NON-FEDERAL	$2,180,118	$889,245
Corporate Securities	1,328,136	337,768
State and Municipal	851,982	551,477
Total Capital	**$2,180,118**	**$889,245**

ENR INDEX NUMBERS

Index Base = 100		1913	1926
Construction Cost..	June '48	455.80	219.10
Building Cost.....	June '48	339.26	183.39
Volume	May '48	258	113

EDITORIALS

VOLUME 140 NUMBER 26

June 24, 1948

Flood Warning Responsibility

DIKES to keep flood water out of low-lying land are among the oldest and simplest engineering structures; also records of their failure are as old as history. With present-day knowledge, however, when the surprise element in such failure causes loss of life, as in the recent disaster at Vanport, Ore., something is wrong with our supervisory system. Definite reponsibility for public safety along the Columbia is particularly desirable because this stream, from the flood control standpoint, is still unregulated. Bonneville Dam does not develop storage, and Grand Coulee, besides being above important tributaries, cannot be an important factor in prolonged floods of such magnitude. (The recent flood reached 1,030,000 cfs. at Portland compared to the 1894 peak of 1,170,000 cfs.) The question of how much investment is warranted for protection against floods to be expected once in 50 years, and where advance warning can always be had, is a debatable matter. Meanwhile there can be no quibble about the urgent necessity for constant vigilance where public safety is concerned. Responsibility for this is shared by all agencies involved, both public and private. The situation on the Columbia is the current case in point, but it applies equally to every other stream in the country. And as flood walls and levees are built higher, and multi-purpose storage reservoirs increase in number, more agencies tend to share the responsibility. Ways, therefore, must be found to coordinate operations and to correlate interpretations and warnings of flood possibilities so as to avoid loss of life.

Structural Welding Advance

WHEN STANDARDIZATION becomes possible in an industry a landmark has been reached, usually signalizing that custom operations may be discarded in favor of mass production and that a product of more uniform quality can be turned out. Thus, with the standardizing of connections, structural welding may be said to have entered a new stage of development, which may result in a vast increase in its use. Many of the advantages of standard welded connections are emphasized in the description of the Air Reduction Co. research laboratory (p. 271), in which extensive use was made of such details. Other advantages worth weighing include simplification of design as an aid to less experienced detailers, mass production and stocking by fabricators of the most frequently used connections, easier shop and field inspection, and provision of a definite criterion for estimating costs. Also, ready evaluation of the technical merits of a proposed welded design becomes more feasible. The last has encouraged the adoption of standardized connections by the Canadian Welding Bureau of the Canadian Standards Association, a step that is expected to overcome the objections of many building officials to welding. Similar approval in the United States of standardization of the most frequently used types of connections would also be a distinct advance.

Mixing Politics and Engineering

THE IMMEDIATE REACTION of most engineers probably was favorable to the rider attached to the Interior Department appropriation bill that states that no part of the money is to be used to pay the salary of a commissioner, assistant commissioner or regional director of the Bureau of Reclamation who is not "a qualified engineer with at least 5 years of engineering and administrative experience." Sober reflection, however, produces grave doubts of the wisdom of such a move. It also suggests a more fertile field for Congressional action.

The rider, it should be noted, was not attached to the bill as a result of a carefully thought-out conclusion on the part of Congress that only engineers could be entrusted with the top positions in the Bureau of Reclamation. It was a political move designed to get rid of Commissioner Michael Straus and Regional Director Richard Boke by a clever maneuver, unworthy of Congress and not in accordance with the fundamentals of our system of government. If the two men are guilty of misconduct, they can and should be removed by orthodox legal means in which they would be given an opportunity to defend themselves and their policies.

The appropriation bill rider does, however, serve a useful purpose in focusing attention on the present organizational set-up of the bureau. Ever since direction of its work was taken out of the chief engineer's office in Denver and placed in the hands of seven regional directors reporting directly to Washington, there has been a growing belief that the change was dictated more by political than by engineering or administrative considerations. Certainly, and rather obviously, it implements the idea originated by the Roosevelt administration that the Bureau of Reclamation was a handy vehicle to use in furthering its public power objectives. And the close-knit centralization of authority has also aided, and been used to foster, social reform theories—such as the attempt to break up the large land holdings in California's Central Valley—which may or may not be in the public interest.

Evidence of public concern over conditions within the Bureau of Reclamation is found in a resolution adopted last fall by the Association of Western State Engineers, which denounced replacement of experienced men in the bureau and the "introduction of debatable policies based on questionable theories" into the operation of the federal agency.

It is not clear why a requirement that the commissioner and regional directors be engineers could result in any major improvement. What is needed is a change in outlook at the very top, and until that comes the rider can only result in putting a couple of engineers "in a hot spot". What Congress could better do than engage in a political vendetta would be to force the bureau back into its true irrigation functions, and to permit it to have the politically free merit system of appointments that obtained under the previous two commissioners—John Page, an engineer, and Elwood Mead, who was not an engineer.

In the meantime, engineers should reflect on the fact that the positions of commissioner and regional directors in the Bureau of Reclamation are primarily administrative and not engineering in character. Therefore, much as the engineering profession might wish to see those positions filled by engineers, they should also be open to the lawyers, agronomists, accountants and others who work for the bureau.

Engineers can rightly insist on having the positions of chief engineer of the bureau and project engineer in the regional offices filled by qualified engineers because those are positions where technical knowledge and skill are essential. They can also insist that all engineering and construction decisions stem from the chief engineer rather than the regional directors. But if the top administrative positions are to be filled by engineers, such appointments should only result from a demonstration of superior ability in a field that is open to all comers. Not only the engineers themselves, but the engineering profession, as well as the public interest, stand to gain most by such a policy.

Marshall Plan Economics

THOSE in the construction industry and American business generally who have feared that the European recovery program is going to exert a damaging and continuing drain on our economy can get some reassurance from the article in this issue on France's Genissiat Dam. All materials and equipment for this largest of hydro-power projects in Western Europe were manufactured in France. The reassuring fact here is that what has been done once can be done again, not only in France, but in Great Britain, Switzerland, Italy and Belgium, and eventually in Germany.

Our principal job is to get Europe's industry back on its feet, not to supply the products that this industry can turn out. There is thus a foreseeable end to our aid if we adhere to this main objective.

The danger lies in our being sidetracked by the injection of specious methods of implementing our basic policy. One such method would be to attempt to economize on the initial expenditures as some elements in Congress seem bent on doing. That way lies a relief not a reconstruction program; and it could go on forever.

Another crippling method of action would be to prohibit trading between the countries of east and west Europe, for it is only by such trading that western Europe can recover and free herself of our help. Here is a problem that must be resolved by a change in our foreign policy, which right now favors opening the Danube to shipping, but looks with disfavor on trading with Russia or her satellites. Who else is there to trade with on the Danube? We must be realistic.

The Marshall Plan is a business plan that has every chance for success if domestic politics and foreign diplomacy do not wreck it. Engineers and construction men, who have such a great stake in its success, should lose no opportunity to oppose specious proposals affecting the ERP as soon as they appear. Otherwise the fear of never-ending aid to Western Europe may, indeed, become a fact.

ENGINEERING NEWS-RECORD

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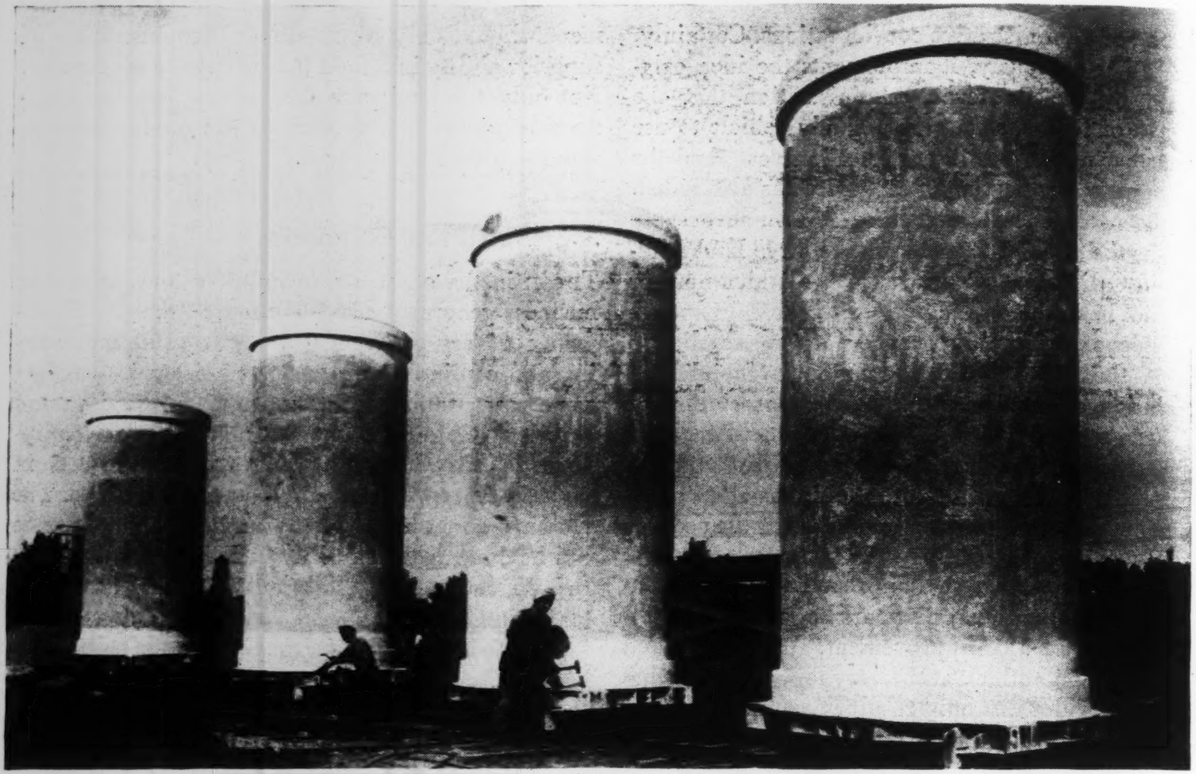


Economy in steel and cement was achieved by making . . . .

Big Prestressed Pipe Without Liners

R. M. Doull
General Manager, The Preload Company
Montreal, Canada

A DRAMATIC EXAMPLE of economy in the use of materials, notably steel, was achieved by the adoption of prestressed-concrete pipe for an 84-in. water intake at Montreal. Constructed without the use of an inner diaphragm, it was possible to make some 9,500 ft. of this huge pipe with a saving of 800 tons of steel and the use of 10 percent less cement than that required in a conventional design.

The project came into being as a result of Montreal's need to build a new and larger water supply intake from the St. Lawrence River. Plans drawn by the city's engineering staff specified the use of four 84-in. inside diameter concrete pressure pipes laid in the river bed and extending out some 2,000 ft. These intake pipes are to be encased in a heavy concrete cover to protect them from the action of the ice and the swift current which prevails at the chosen location.

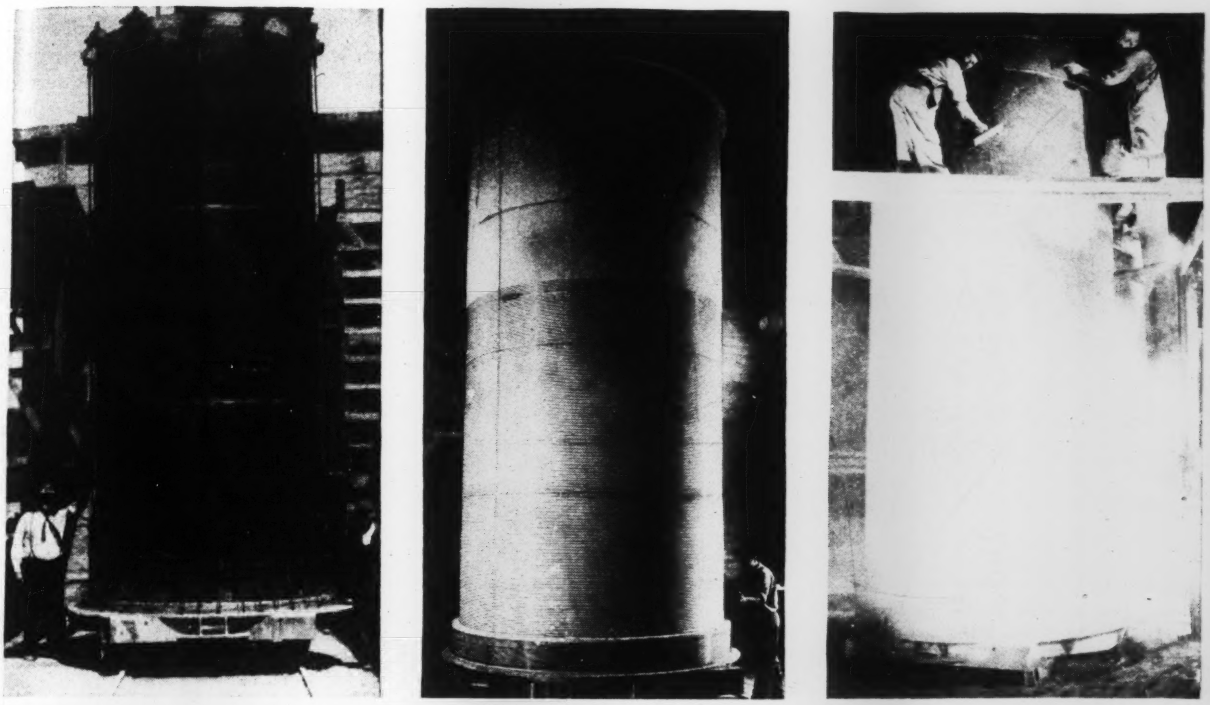
Following the receipt of bids for a number of alternative designs, the city engineers accepted the design of The Preload Company. This was considered by some engineers as a daring move to make, because fully prestressed concrete pipe of this size without a steel diaphragm had never before been made on this continent, and little related test data were available.

Considerable quantities of prestressed pipe of various sizes had been successfully made in Europe and Australia, notably those built by Freyssinet in France and under the Rocla patents in Australia. In the United States, where prestressed pipe is now becoming widely used, many miles of smaller sizes, principally with steel diaphragms, had been built. However, the principles of the design now specified had been fully tested in theory and in practice on many large circular structures in Canada, the United States, and elsewhere.

Features of design

Each pipe section weighs about 16 tons, is 18 ft. long and 84 in. inside diameter, with walls 5½ in. thick. A total of 532 lengths were required for the intake.

The most interesting feature of the design was the method of reinforcing, which prestressed the concrete both circumferentially and longitudinally.



Steps in production . . . Inner steel form is placed on flat-car and longitudinal wires are fully stressed. Then (center) the concrete core is wound with wire to provide circumferential stressing. Finally (right) a mortar covering is gunited over the prestressed wires to complete the fabrication of the pipe.

By use of this design it is possible to eliminate a substantial tonnage of reinforcing as well as the steel diaphragm which has, in the past, been used in pressure type concrete pipe. In addition, the sectional area of the pipe wall can be safely reduced. These factors reduced the weight per foot of pipe, making possible, for any given maximum lift, the use of longer pipes with correspondingly fewer joints than possible with other conventional designs.

Reinforcing was divided into two major systems—longitudinal and circumferential. Longitudinal steel consisted of twelve pairs of wires each 0.44 in. diameter, equally spaced around the perimeter and located in the center of the core wall. The designed initial prestress in this steel was 70,000 psi, which induced 188 psi. compression in the concrete. The calculated loss due to elastic deformation, plastic flow and shrinkage amounts to 20,000 psi. in the steel and 55 psi in the concrete. Longitudinal bending in the pipe, if supported by a single sling at the mid-point, would reduce these stresses further at the critical section by 300 psi. in the steel and 30 psi. in the concrete. Residual stress after allowing for the above becomes under the worst conditions 49,700 psi. in the steel and 103 psi. in the concrete.

Circumferential reinforcing consisted of a continuous spiral of wire wound on the concrete core. This wire, which was developed for prestressed concrete work, is No. 8 gage, and has an ultimate strength in excess of 220,000 psi, and a yield point of not less than 175,000 psi. Spaced at 0.31 in. on the flanges and 0.63 in. on the barrel, the wire was applied under an initial stress of 150,000 psi. inducing a compressive stress in the concrete of 725 psi. The hydrostatic test pressure of 50 psi. reduces the concrete stress by 412 psi. and increases the steel stress by 5,120 psi.

Change in stress due to plastic flow, shrinkage, and elastic deformation reduces the concrete stress by another 195 psi, and reduces the steel stress by 40,000 psi. The net result of the above leaves a residual stress, under test pressure, of 108 psi. compression in the concrete and 114,120 psi. tension in the steel.

Plant layout and equipment

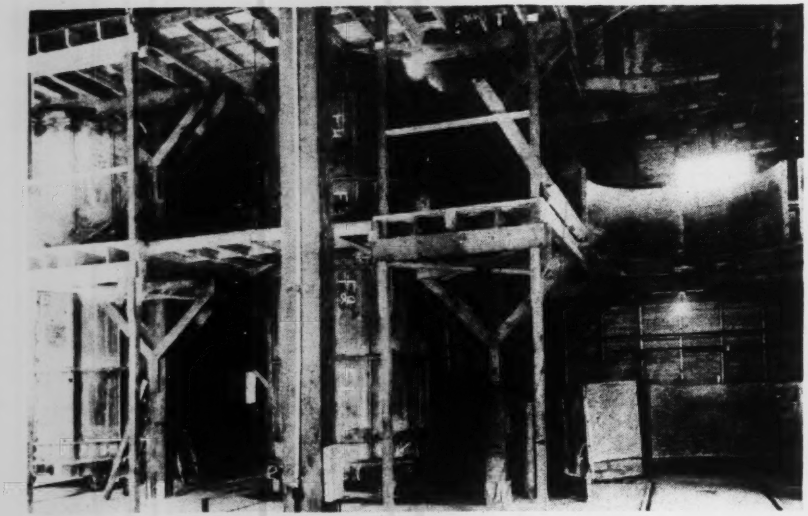
The plant in which the pipe was manufactured was designed to produce an average of three 18 ft. sections per day. In addition to the plant building, which had a total floor space of only 7,400 sq. ft., ample space had to be provided for the storage of materials as well as the finished product.

A 25-ton travelling derrick, running on standard gage tracks, handled all the lifting. It charged the steel bins which fed the mixing plant; set and stripped the heavy inner steel forms; lifted the pipe sections on and off the hydraulic test bed; and finally, moved the finished pipe from the cars to the storage area.

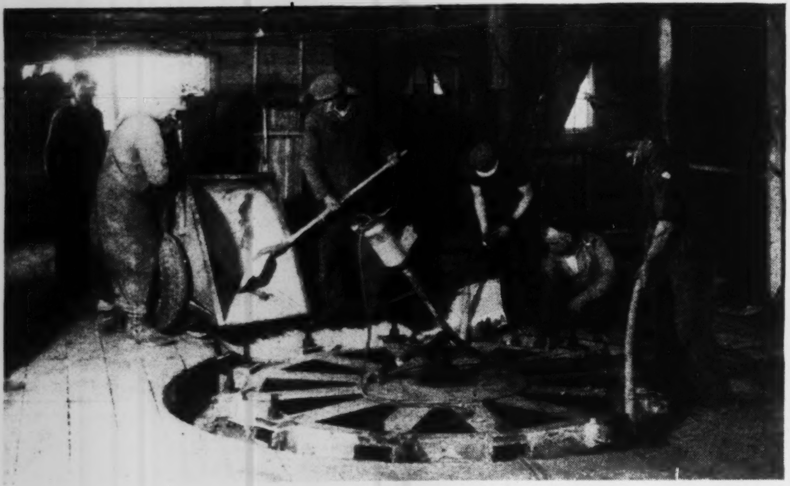
The plant contained an 80 hp. steam boiler, which in addition to supplying live steam for the curing chambers, also furnished heat to the plant itself as production was carried on during the winter months.

Another multi-service unit was the compressed air plant. This consisted of a 365 cfm. compressor and receiver, driven by a 75 hp. motor. Air from this machine was used for the gunite work, operated the winches, vibrators, impact wrenches and miscellaneous pneumatic tools used in the manufacturing process.

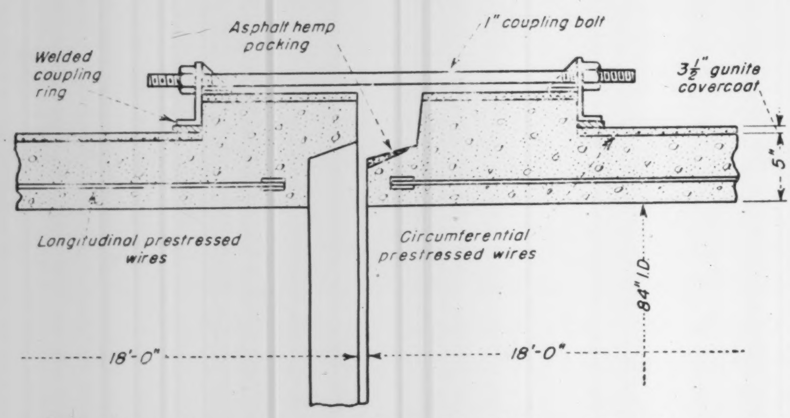
The entire plant and storage area was tracked with standard gage lines. Turntables were used for switching



Forming assemblies are made up in each of three pouring positions. Beginning with outside sections, the form segments are assembled in tiers of four rings. Two working platforms faciltate. . . .



Pouring operations, which are begun after half the pipe is formed, are then finished from the top platform.


Asphalt hemp packing
1" coupling bolt
Welded coupling ring
$3\frac{1}{2}$" gunite covercoat
5" core
Longitudinal prestressed wires
Circumferential prestressed wires
84" I.D.
18'-0"
18'-0"

Jointing of pipe sections is accomplished with a bell and spigot fitting drawn tight with coupling bolts.

to conserve space. On these rails were mounted 27 special cars. These cars had machined top plates that served as the form for the inside of the bell end of the pipe and were so constructed that they accurately located the inner steel form. Each pipe section was completely built on one of these cars and remained vertically in place until ready to be transferred to test or storage.

The cars also acted as the anchor for the vertical prestressing: a central hub, bored concentrically with the machined top plate, served to center the inner form and also to center the car and pipe for wire winding. Cars were easily moved from one station to another by means of air winches located at strategic points.

Methods of production

Production started with the setting of the inner form on the car. This inner form was a steel cylinder 84 in. O.D. and about 18 ft. long. A series of levers, carried on a central operating column, were attached to the inner wall of the shell. These levers were so designed that when the operating column was lifted, the shell, which had a single longitudinal joint, was contracted, reducing the diameter by approximately $1\frac{1}{2}$". This was a sufficient reduction to permit the form to be withdrawn from the concrete core at a later stage in the operation.

In setting, the form on the car was lifted by the yard crane from a shackle at the top of the operating column and set in place on the machined top-plate of the car. The operating column was then forced downward, thus expanding the form to full diameter and locking it in place.

The car, with the form in place, was moved to the next station where the longitudinal prestressed steel was applied. The form now served a second purpose.

The twelve sets of twin, high-tensile strength, steel wires were set at equal intervals around the circumference of the form. A special nut was welded at the end of each of these pairs of wires. The lower end was anchored to the car body by means of a tapered wedge bolt extending upward from the underside of the car frame, and threaded to match the special nut on the wires.

The upper ends of the wires were

Fabrication of the pipe was carried out in a weather-tight building so that production could be conducted through the winter months. A 25-ton traveling derrick was so located that it could handle lifts in the building through roof hatchways.

similarly secured with tapered bolts passing up through the arms of a heavy spider, or frame, resting on the top of the inner form. The protruding ends of these top bolts were threaded for the fine-thread stressing nuts.

After setting the wires in place the stressing nuts were tightened by hand to take up the slack in the connections. A torque wrench was used for the final adjustment so that each pair of wires carried approximately the same initial tension before prestressing.

Prestressing of the wires was accomplished by drawing up the stressing nuts with a pneumatic wrench. A simple gage was made to measure the elongation of the wires necessary to impart an equal predetermined unit stress in each of the twelve pairs of wires. An elongation of about ½ in. was required. The stressing of these twelve units developed a total load of 260,000 lb. that was carried, through the car frame and spider, by the inner form acting as a column.

The partly assembled unit was then moved to one of the three pouring positions. The pouring area had two working floors, one about 9 ft. above the car and the other at the top of the pipe. First operation at this location was the erection of the outside steel forms. These forms were made in four rings each about 4½ ft. high. Each ring was made in three segments for ease in handling, erecting and stripping. The lower ring, forming the outside of the bell end of the pipe and part of the barrel, was bolted to the car and the second ring assembled on top. These two rings, forming about half of the core, were then poured from the first level and the second pair of ring forms were erected. The second and final pour was made from the second or top working floor.

Concrete mixing and placing

The concrete used in the cores was produced under careful control. Storage hoppers located on the top of the plant, and charged by the traveller equipped with a clamshell, fed the aggregate to the weigh batcher. Cement, sand, two sizes of crushed stone and water were accurately weighed by this plant and fed into a half-yard mixer. The mixer discharged its batch into hoppers located on each pouring level through a series of gravity chutes. The concrete thus produced had practically zero slump and averaged well over 4,500 psi. compressive strength at 28 days.

The concrete was taken from the hoppers in buggies to the various pouring positions where it was deposited in the forms, and internally vibrated. Two vibrators were used for this purpose with 2¾ in. diameter vibrating heads. Each lift of about 9 ft. was poured continuously and as the concrete crew moved from one pipe section to another, the form crew erected each succeeding set of rings. Three pipe cores were poured during each 8-hr. shift.

The outer forms were left in place in the pouring position over night and were stripped the following morning, cleaned, oiled and re-erected. By staggering the hours of work of the various crews each operation was able to run without delay or overlapping.

After the stripping of the outer form, the core, with the inner form and stressing bolts still in place, was moved into the first steam curing chamber. This chamber, closed at each end with heavy wooden sliding doors, was large enough to store twelve pipe sections at one time on the two lines of track. Heating coils were provided along each wall with a live-steam line directly under the coils. The live-steam line was provided with pet-cocks to admit steam, which passed up through the heating coils between the building wall on one side and a baffle plate on the other. Temperature and humidity were thus controlled during the 72-hr. curing period, at between 90-100 degrees F. and 100 percent relative humidity.

Following the curing period the cars were moved to the next position. At this point a large roof hatch directly over the pipe was opened and the twelve stressing bolts removed from the top spider, thus releasing the full longitudinal prestress to be carried by the concrete core. Tests showed that the concrete had attained at this time a compressive strength in excess of 3,000 psi.

The inner form was then removed by lifting vertically on the eyebolt at the top of the operating mechanism with the derrick. As the operating column was raised, the radial arms contracted drawing in the shell of the form and reducing the diameter by about 1½ in. At this point the form was clear of the concrete and was lifted out through the hatch. The form was then swung back to the first assembly position and set in place on another car. After cleaning and oiling it was then ready for another cycle of production.

Circumferential prestressing

The core was now ready for circumferential prestressing or wire winding, which was done on a machine designed and built for this specific purpose.

The wire winder consisted of two essential parts—a turntable and a wire-stressing device. The turntable, 10 ft. in diameter, was carried on twelve adjustable rollers. It rotated about a heavy air-operated ram which could be extended or retracted to engage the central casting on each car to center the pipe on the table during the winding operation. The table was driven by a heavy ring gear, which also formed part of the frame of the table itself. This gear was engaged by a pinion which in turn was driven through reduction gearing by a 25 hp. motor. Variable speed control was provided to permit adjustment of the peripheral speed of the pipe core between 200 and 300 fpm.

No steady bearing was required at the top of the pipe as the strand load of the wire during winding operations was not sufficient to exert any serious overturning moment.

The stressing device consisted of two main parts: (1) a steel track made of I-beams rigidly secured at top and bottom and parallel to the axis of the pipe; and (2) a power-operated traveller mounted on these tracks. The wire was mounted on a reel and fed through guide pulleys and rollers to a wire-drawing die located in this traveler. The die was of predetermined size so that the pull, or strand load, required to draw the wire through the die was sufficient to create the desired unit stress in the wire itself.

Turntable and traveler synchronized

The traveler, carrying the die mechanism, was moved vertically by two endless chains engaging sprockets mounted on shafts at the top and bottom of the steel track. The bottom sprocket shaft was driven through gears by a positive mechanical drive from the turntable countershaft, thus synchronizing the rate of travel, or pitch, with the turntable. Two speeds were required on the traveller and this was accomplished by a simple gear shift on the lower sprocket shaft-drive. This lower shaft was also provided with a handwheel and clutch so that the mechanism could be set manually at any desired position.

The wire was first drawn through the die and attached to the pipe. A special anchor cast in the lower flange of the pipe core was used for this purpose. The pipe was then rotated by the turnable and, with the correct gear setting, wire was wound on the lower flange at a pitch of 0.31 in. A print or recess with a steel anchor was cast in the concrete at the point where the diameter of the core changed from flange to barrel. This device led the wire from one diameter to another, permitting continuous winding without the necessity of cutting and tying off at such points.

The gears on the traveller were shifted after completing the flange, and the winding continued on the barrel at 0.63 in. spacing until the top flange was reached. Another print in the concrete at this point led the wire to the surface of the top flange where the pitch was reset to 0.31 in. At the top of the pipe another special anchor was provided, cast in the concrete core, for the purpose of tying off the wire and holding it mechanically until bonded in place by the cover coat.

Since each pipe section required about one and two third coils of wire, or about 500 lb., at least one splice was required on every pipe as the largest rolls of wire available contained about 300 lb. In order to splice the wire the stressing was continued until only a few feet of wire remained behind the die, then the top wire was clamped with temporary anchors to the preceding wires. The wire was cut and a new coil threaded through and connected to the wire on the pipe by means of a simple torpedo splice and the winding continued. The temporary anchors were removed after the completion of the prestressing.

It was necessary, of course, to keep strict control of the unit stress in the wire at all times. This was done in two ways. The actual strand load was checked by means of a calibrated torque wrench operating through a series of levers connected to the floating die carrier. By operating this wrench while the machine was in operation the die carrier could be lifted from its support thus giving a fairly accurate measure of the strand load. By micrometer measurement of the diameter of the wire the unit stress was thus easily determined. This approximate check was made on each coil of wire used. In addition, periodic checks were made by measuring the "snap-back" or elongation in the wire, by cutting out a section of wire which was accurately measured before and after cutting.

Applying the cover coat

The wire-wound pipe was then moved to the next position in the production line where the gunite cover coat was applied. Gunite was mixed in the proportion of one part cement to four parts sand, to which was added 5 percent by weight of hydrated lime. A standard cement gun, equipped with a dual hydration nozzle, was used to shoot the gunite in place. The gunite was shot in one coat to a total thickness of about ¾ in.

The two end flanges, and a short section of the barrel at each flange, were finished accurately, using steel gages, to permit the application of the steel coupling rings which will eventually couple the pipes together. The balance of the gunite surface was screeded only, leaving a rough-textured finish to assist in bonding when the pipes are embedded in concrete in their final location.

After the gunite had set sufficiently the pipe was moved into the final curing chamber and cured by the same method followed in the earlier stage for the concrete cores. Following this, the finished pipe was removed from the plant, lifted from the car by the yard derrick, and transferred to the storage yard or the test bed.

Test procedures

Five per cent of the pipes, selected at random by the engineer, were subjected to hydrostatic pressure tests. For this purpose the pipe was set vertically on a concrete base centered about a steel cylinder. A heavy machined steel cover was then placed on top of the pipe and inner cylinder and securely bolted down to steel beams cast in the base. The pipe was gasketed at top and bottom. Space between the pipe and cylinder was then filled with water and the pressure raised to the specified test pressure of 50 psi. This pressure had to be maintained for fifteen minutes without any sign of leakage. Not a single pipe showed any sign of failure under this test.

The first pipe produced in the plant was subjected to a series of handling tests, designed to approximate field conditions. During all these tests check measurements to the nearest sixty-fourth of an inch were made to check deflections. First the pipe was slung on wire slings from the quarterpoints, raised and lowered, and then lifted by a single sling from the mid-point. It was then rolled on timber skids through 180 degrees, lifted again and remeasured. After further rotation it was set on a heavy timber bed, resting only on the end flanges with a bearing of about 20 sq. in. at each end. The pipe was then loaded on top with sandbags over its entire length applying a load of about 1000 lb. per lineal foot. Frequent measurements during all these tests showed no deflections within the capacity of the measuring devices.

The final physical test was then applied. The pipe was first balanced on a heavy steel knife-edge. Once again no measurable deflection could be found. Then the pipe was raised 6-in. and allowed to fall freely on the knife-edge. The gunite cover coat was scored but no cracks developed. This operation was repeated from 12-in. and then from 24-in. The first drop was made so that the impact was applied directly over one pair of longitudinal wires; the second and third were made so that the force was applied between two pairs of longitudinals. The only damage noted was a scoring and crushing of local areas of the cover coat. The wire was not cut and there was no sign of any failure of bond between the gunite and the concrete core.

A section of pipe about 4.6 ft. long was then cut out of the center of the pipe with pneumatic chipping hammers. The steel rods and wire were cut close to the ends of this section, the bond being intact, no loss of stress was expected. This unit was then tested under ASTM C-76-40T specification for three-edge, bearing crushing strength tests with excellent results. The deflections were carefully measured by instrument as the load was built up. The first crack appeared at the crown and invert at a loading of 6.690 lb. per ft. and a deflection of $\frac{1}{8}$ in. The loads were gradually built up to 13.500 lb. per ft. at which time the deflection was 1 55/64 in. The measuring device was then removed and the loads gradually increased to 15.600 lb. at which point the section failed.

Savings in steel and cement

The development of this pipe furnished an interesting and startling example of the economies that can be effected by the use of prestressed concrete. From the cost aspect, the city of Montreal was able to make a substantial capital saving by adopting this design as opposed to the conventional type previously used. In these days of shortages of critical materials the reduction in the requirements of cement and steel was of major importance. The saving of cement under this design was small, about 10 percent, but the reduction in steel quantities was impressive. Each pipe section required about 800 lb. of steel compared with about 3.800 lb. under the conventional design. This represented a total saving in steel of about 1,600,000 lb.

Aerial Mapping Cuts Surveying Costs

Aerial photography is saving cities millions of dollars and months of work, the American Public Works Association reports.

Civilian engineers are taking full advantage of improvements in aerial map-making developed during the war. Aerial photography of cities is being used especially for planning superhighways and land-use studies.

Cleveland officials claim that aerial mapping of that area is saving taxpayers $2 million. By taking pictures from an altitude of 3.500 ft., stereopticon cameras reduce ground surveying to minimum and produce maps with good detail.

The Chicago department of superhighways is using aerial maps extensively in developing the new Congress Street expressway, an eight-mile, eight-lane thoroughfare being built at a cost of $61 million. Air photographs saved considerable preliminary ground work, as the expressway slices through a congested part of the city.

Aerial mapping has been used recently in Atlanta, Fort Wayne and several other cities undertaking superhighway projects. Use of stereopticon cameras and advanced techniques permit determination of building heights and terrain contours with amazing accuracy. Height and depth variations as little as two feet can be detected.

The San Diego city planning department is one of the many planning agencies currently using aerial photography. San Diego is using aerial pictures in development of new park and recreation property created by deposits of dredged material in Mission Bay.

Muncy, Ind., is completing revision of zoning regulations after mapping the city by air to determine land use. Several states have prepared air maps for community use. In Pennsylvania, cities and townships including Erie, Lancaster, and Manheim have prepared zoning ordinances based on state aerial surveys.

Air maps prepared before and after highways or other public works have been constructed have proved valuable to state and city governments in damage suits by property owners. The pictures show exactly what property has been damaged and to what extent.

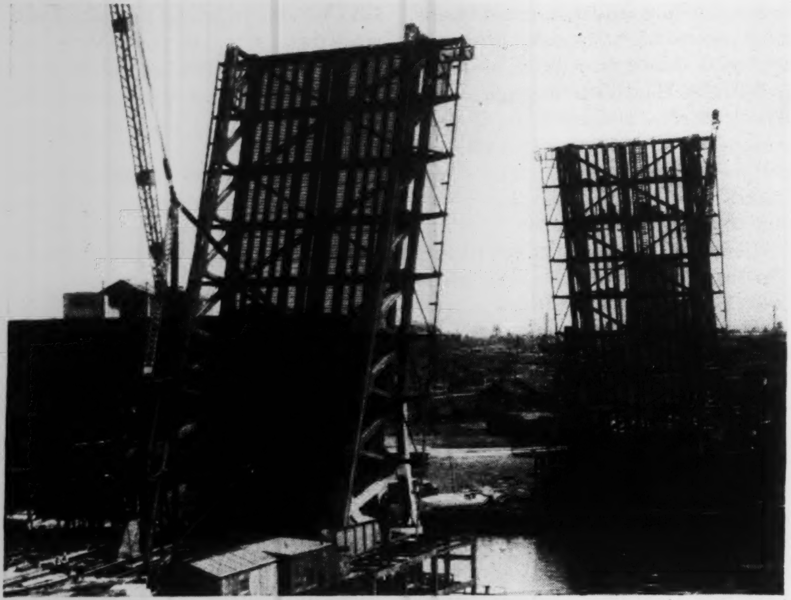


Fig. 1. Erected in raised position, two leaves of bridge, were completed to full height after loads had been transferred to trunnion bearing supports.

Bascule Bearings Jacked to Position

T. P. Lewis

Manager of Erection, The Mount Vernon Bridge Co., Mt. Vernon, Ohio

LOCATION of trunnion roller-bearings to exact position on their supports was of prime concern in the erection of Chicago's new South Canal St. double-leaf bascule bridge, recently opened to traffic. Jacking procedures here described proved effective in adjusting the bearings to position.

Designed by the Bridge Division of the City of Chicago, the new structure across the South Branch of the Chicago River has two movable leaves—each 68 ft. wide and 163 ft. long, c. to c. of anchorages—that carry a 44-ft. roadway and two 9-ft. sidewalks. The distance from the center of the trunnious of one leaf to the same point of the other is 254½ ft.

Each leaf, weighing 1,770 tons, is supported on two trunnions fixed transversely through the leaf trusses and carried on four special heavy-duty roller bearings, two to each trunnion. A counterweight of steel and concrete, weighing about 900 tons is built into the rear end of each leaf to counterbalance the river portion.

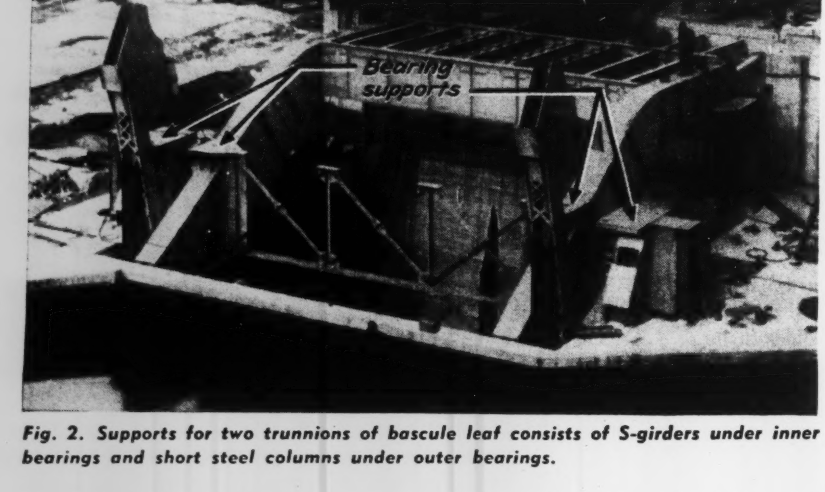


Fig. 2. Supports for two trunnions of bascule leaf consists of S-girders under inner bearings and short steel columns under outer bearings.

Rollers and races of the bearings are alloy steel, hardened and ground, each bearing containing two rows of 3-in.-dia. rollers held in position by a bronze cage. The inner race, bored for a close fit on the end of the trunnion shaft, is 24 in. in outside diameter. The outer surface of the outer race is machined to a spherical surface of 38 in. dia., fitting a similar surface on the inside of the bearing housing to allow for any slight misalignment of the bearing housing without affecting equal distribution of the load to the rollers.

Bearing housings have synthetic rubber seals at both ends.

Leaf erection

The movable leaves were erected in the fully raised position. Counterweight framing members were placed first in the pit, held in approximate position by means of wood blocking. Trusses for the bridge leaf followed, starting at the bottom, where they were connected to the ends of the counterweight frame. As erection of the trusses progressed upward, temporary erection supports were placed to carry the additional weight (Fig. 3).

Originally it had been planned to carry the erection of the trusses to a point just above the trunnions and then transfer the weight of the partly erected leaf to the trunnion bearings. However, to gain time while awaiting delivery of the bearings, trusses were erected considerably beyond the trunnions before the bearings were placed and the weight transferred to them.

Each bearing had to be located at an exact elevation on its supporting structure to carry its portion of the total load. In addition, the four bearings of each leaf had to be accurately located on a common axis, at the proper elevation and parallel to the axis of the opposite leaf, so that the leaves would meet correctly.

Bearings for the outer ends of the trunnions rest on short steel columns, while those for the inner ends of the trunnions are carried on S-shaped girders about 46 ft. long (Fig. 2).

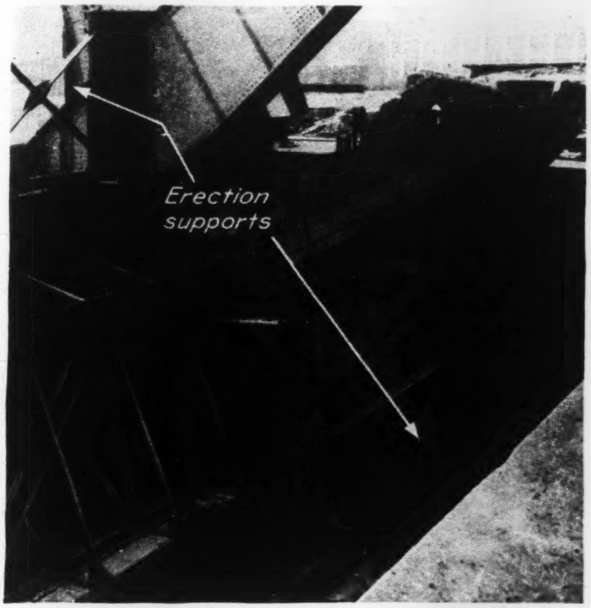


Fig. 3. Temporary steel brackets helped support leaf trusses during erection. In this view, S-girder partially obscures forward bracket.

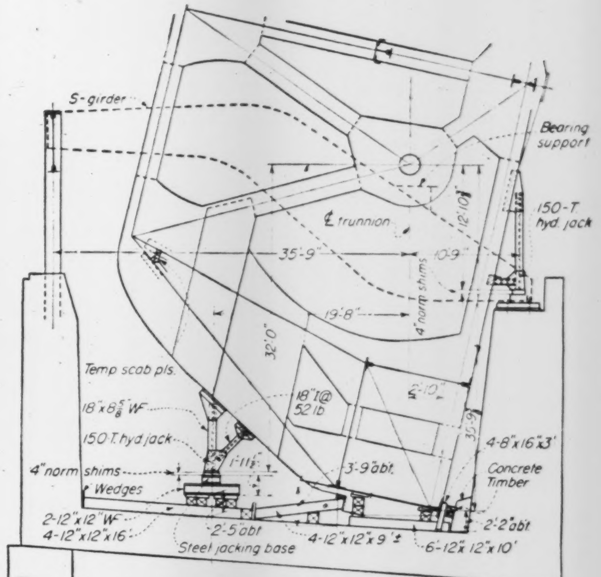


Fig. 4. Hydraulic jacks in temporary erection brackets adjusted the leaf assembly vertically and lateraly to set trunnion bearings in predetermined position on bearing supports.

The girder supports for the inner bearings added a further complication to accurate location because the S-girders were due to deflect when the full load was placed on the bearings. This deflection was calculated to be ¼ in. in elevation and $\frac{3}{16}$ in. laterally. Thus a means of shifting and adjusting the partly completed leaves was of prime importance in planning the erection operations.

Hence, the temporary erection supports—four per leaf—were the key to the erection procedure (Fig. 4). These supports were short, bracket-like steel columns bolted to the leaf trusses and so located as to be about equidistant from the center of gravity of the partly erected leaf. They accomplished a double purpose, furnishing a means of jacking and adjusting the leaf for final location of the bearings, in addition to supporting the leaf. Each support was provided with a 150-ton hydraulic jack and a set of shims at the base for adjustment.

In placing the trunnion bearings on the ends of the trunnion shafts, temporary clamping bolts were used to hold the bearings snugly against ⅛-in. spacers inserted at the quarter-points around the thrust collars of the bearings. This arrangement assured that the bearings would be held in correct position laterally on the trunnion shafts while adjustments for elevation and longitudinal position were being made.

Adjusting the leaf

With the bearings in position on the shafts, the partly erected leaf, weighing about 500 tons, was adjusted to exact elevation.

Measurements then were made between the bases of the bearings and their supporting surfaces, and suitable shims were selected to agree with the measurements. The leaf was raised slightly, and the selected shims slid into place under the bearings. Lowering the leaf gradually, a comparison was made of the amount of load applying to each of the four bearings. Minute changes in the shims were made until the four bearings carried loads of equal magnitude.

With the correct shims under each bearing, the next operation was to shift the leaf assembly horizontally until the four bearings were in exact position with reference to a common axis of rotation parallel to the same axis for the opposite leaf. This position was determined from measurements to a fine piano wire stretched through the bore of the trunnion shafts and located by exacting instrument work. To take care of the anticipated deflection of the S-girders supporting the inside bearings, the leaf assembly was raised to permit placing an additional ¼-in. shim under each inside bearing, and the entire assembly was moved towards the river $\frac{3}{16}$ in.

The leaf assembly then was lowered until all the load was carried by the inside bearings. After a final check on the position of the bearings, holes were drilled and reamed in the supporting girders for the inside bearings, using the holes in the bearing bases as a template. As each hole was finished, a $2\frac{1}{16}$-in. round tight-fitting bolt was driven in to secure the bearing against any further movement on the girder.

As erection of the leaf and counterweight proceeded to completion, the load on the inside bearings caused the supporting girders to deflect sufficiently to bring the bearings back to the original and exact position. In the process, the outer bearings gradually came in contact with their supporting columns and took their portion of the load. However, because of the friction of the bearing bases on the supporting columns, the bearings were held slightly out of line—about ⅛ in.

To overcome this friction, a jacking yoke was applied to the base. A jacking force of about 100 tons was applied to move the bearing to correct alignment.

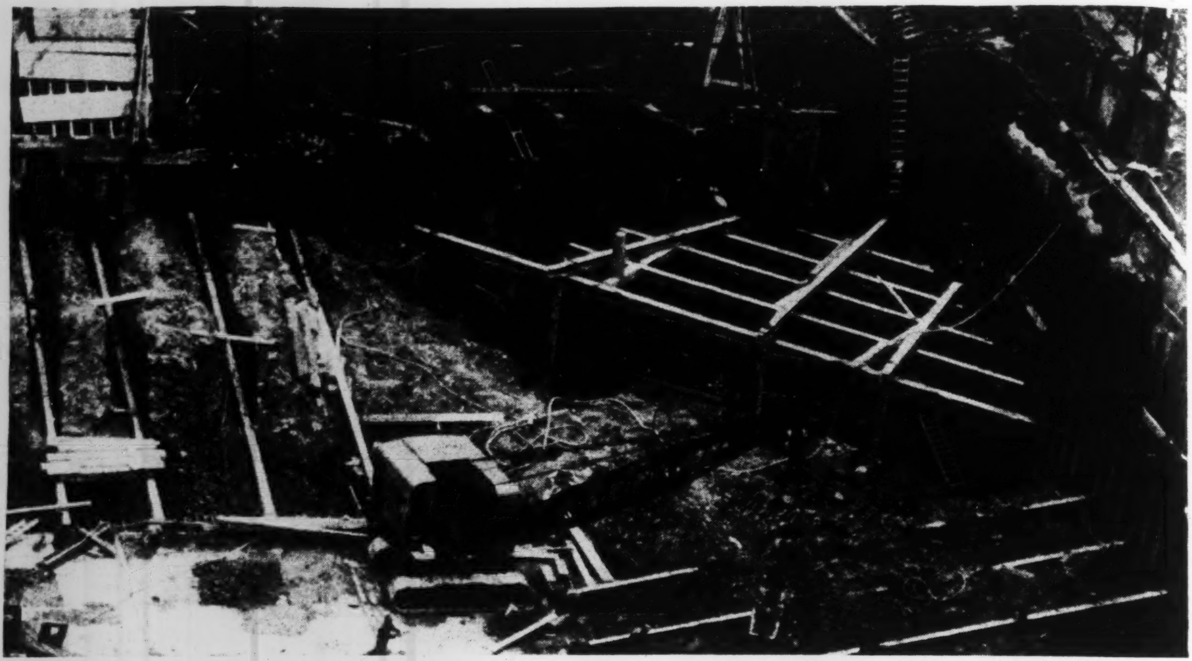


Fig. 1. Short alternate sections of wall were built inside a cellular sheetpile cofferdam to prevent loss of ground under surrounding structures in construction of foundation for the New England Telephone and Telegraph Co. building in Boston.

Cofferdam Protects Nearby Foundations While Boston Builders Excavate

Alonzo DeF. Quinn

Chief Design Engineer, Frederick Snare Corp., New York
Formerly with Moran, Proctor, Freeman & Mueser

***Contents in Brief**—Building a concrete foundation wall inside a 7 ft. wide periphery cofferdam prevented loss of ground from under surrounding structures during construction of a 20-story building in Boston. Center of the large area was excavated and a slab concreted, then long struts butting against the slab were used to brace the walls while excavation was completed. Structural frame of the basement floors serves to brace the walls.*

A CELLULAR sheetpile cofferdam around the periphery permitted building exterior wall foundations and completing excavation inside without danger of loss of support for adjacent structures in constructing a 20-story building in downtown Boston. The foundation walls for the New England Telephone and Telegraph Co. were carried through a deep bed of soft Boston blue clay with underlying running-sand and boulders, and are founded on a very firm stratum of sand, gravel and clay.

The 195x207-ft. structure is bounded by Franklin, Congress and Pearl streets, occupying two-thirds of the block to High Street. There is considerable difference in original surface elevation across the site as well as in elevation of the bearing stratum.

Sidewalk grade at the corner of Franklin and Congress streets is at El. +20, about first floor level, and rises so that the corner diagonally opposite is about El. +30. There are two basements, the sub-basement being at El. —12 or about 42 ft. below the high curb. The bearing stratum, to which the foundations are carried, is shown by contour lines on Fig. 2. It is some 62 ft. below street level in the deepest corner and rises, roughly parelleling the ground surface, to within 43 ft. of high curb.

Results of soil exploration

Tests of samples from the bearing stratum showed it well graded and dense, containing an adequate clay binder, and thoroughly consolidated in past geological ages. Load bearing tests proved it capable of supporting, with substantially no yield, a safe bearing intensity of 10 tons per sq. ft. This intensity was adopted for the final design.

Additional exploration was done with three 6-ft. dia. Gow-type caissons to obtain first hand information on the underlying soil and water conditions. The Gow caissons used were open end cylinders 8 ft. long. After a cylinder was driven and excavated, one of 2 in. less diameter was driven inside the first and cleaned out. This was repeated until hardpan was reached. The test pits encountered fine. running sand under hydrostatic head immediately under the blue clay, with boulders in the lower part of the sand bed.

Grain size determinations were made of samples of the fine sand stratum (Fig. 3) in which the sample from Test Pit 3 proved to be largely non-cohesive silt. In the presence of flowing water this would be expected to flow readily into any open excavation; samples from Test Pits 1 and 2 were silty fine sands, also readily moved by flowing water.

Cellular sheetpile cofferdam

It was essential to prevent the escape of fine sand and lowering of water level from under adjacent buildings and structures during foundation construction. To accomplish this and to support the exterior columns, a concrete cofferdam wall was built around the lot, and sealed into the impervious bearing stratum before disturbing the general area.

A double line of Z type steel sheetpiling was driven around the perimeter of most of the area. Tee sections were provided at 20-ft. intervals in the inner and outer sheetpile walls for cross connections. Thus, the cofferdam was separated into 7x20 ft. sections for excavation and construction of the concrete wall. In one corner of the area, Fig. 2, a single line of cross-lot braced sheeting was used to form a separate cofferdam, about 90 ft. square, for the boiler room excavation.

While the boiler room excavation was being made to subgrade at El. —25, along with the installation of cross-lot bracing, the exterior cofferdam wall was constructed in alternate 20-ft. sections. Steel walers and struts were placed as excavation proceeded; walers were stressed by jacks that forced the steel walers and sheeting outward while steel struts were slipped into place and welded (Fig. 5). Jacking compensated for tendency of the sheeting to squeeze inward as the soil was removed from within the boxes, and mobilized the shearing resistance of the outside clay.

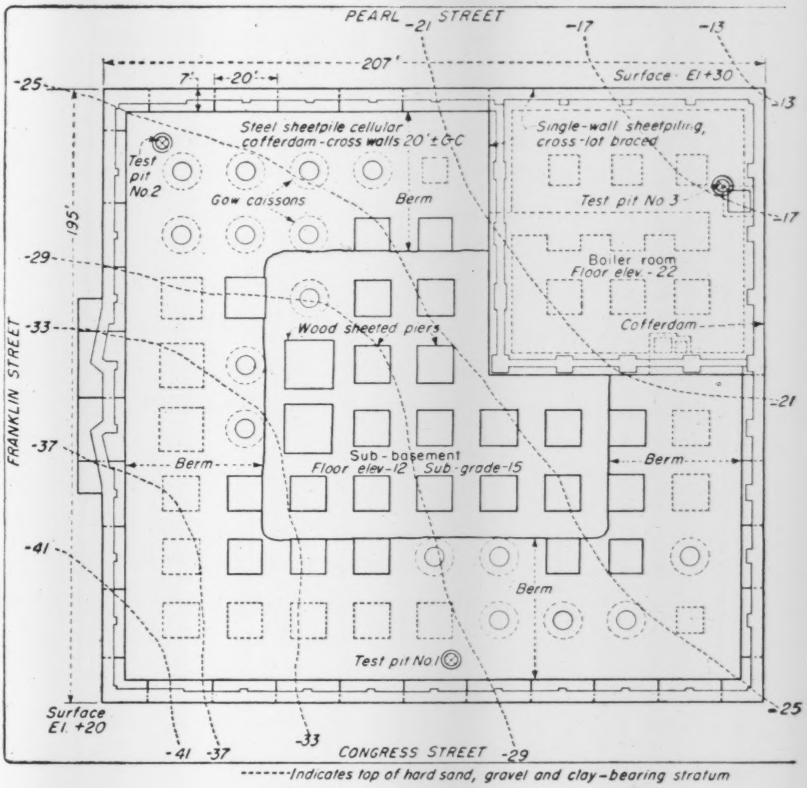

PEARL STREET
-21
-17
-13
207'
7'
20'
Surface El +30
-25
-13
Steel sheetpile cellular cofferdam - cross walls 20' ± C-C
Single-wall sheetpiling, cross-lot braced
Test pit No 2
Gow caissons
Berm
Test pit No 3
-17
195'
-29
Boiler room Floor elev. -22
-33
Wood sheeted piers
Cofferdam
FRANKLIN STREET
-21
-37
Berm
Sub-basement Floor elev -12 Sub-grade -15
Berm
-41
Berm
Test pit No 1
Surface El. +20
-25
-41
-37
-33
CONGRESS STREET
-29
------Indicates top of hard sand, gravel and clay-bearing stratum

Fig. 2. A double sheetpile wall was used around all of the site except boiler-room corner which was a single wall, cross-lot braced.

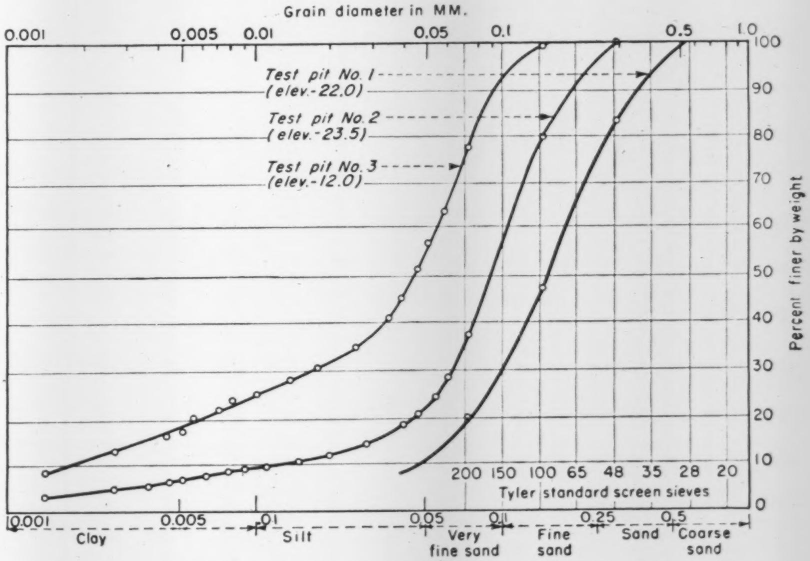


Fig. 3. Grain size determination of samples of silty fine sand stratum underlying blue clay. Classification follows that used by the Public Roads Administration and the Bureau of Soils, Department of Agriculture.

Large boulders in the sand stratum stopped driving of the sheeting in some instances. When excavation reached the boulders they were removed and the sheeting redriven to a seal in the hard bearing material. The flexibility obtained from being able to drive individual sheetpiles permitted ready sealing of the boxes, preventing blow-ins of fine sand and

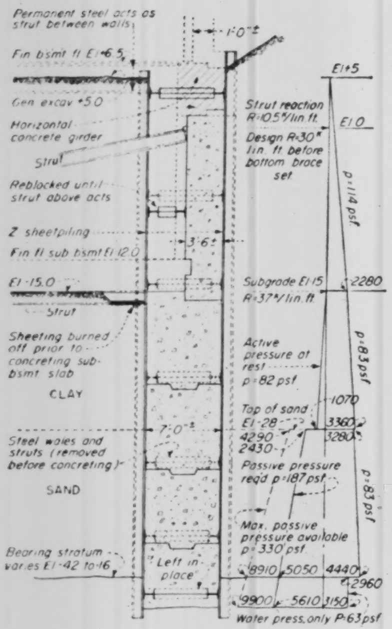

Permanent steel acts as strut between walls
1'-0"±
Fin bsmt fl El +6.5
El +5
Gen excav +5.0
Strut reaction R=10.5k/lin ft
El 0
Horizontal concrete girder
Design R=30k lin. ft. before bottom brace set
Strut
p=114 psf
Reblocked until strut above acts
Z sheetpiling
3'-6"±
Fin fl sub bsmt El -12.0
El -15.0
Subgrade El -15
2280
R=37k/lin. ft
Strut
Sheeting burned off prior to concreting sub-bsmt slab
Active pressure at rest p=82 psf
p=83 psf
CLAY
1070
Top of sand El -28
3360
4290
3280
2430
7'-0"±
Steel wales and struts (removed before concreting)
Passive pressure reqd p=187 psf
SAND
p=83 psf
Max. passive pressure available p=330 psf
Bearing stratum varies El -42 to -16
Left in place
8910
5050
4440
2960
9900
5610
3150
Water press. only P=63 psf

Fig. 4. Cellular cofferdam details and design pressures.

Fig. 5. Jacks were used to force the steel walers and sheeting outward until steel struts could be inserted and welded in place.

resulting settlement of ground. In only three cells were serious "blows" encountered, and these were quickly isolated by installing small wood-sheeted pits around them.

A 3-ft. deep trench was excavated into the bearing stratum to provide a seal and assure adequate lateral support for the concrete cofferdam wall. The lower set of steel walers and struts was left in place as concreting started. Construction joints were made at the underside of each succeeding tier of bracing, and the bracing removed. Concrete was placed directly against the steel sheetpiling up to the underside of the sub-basement floor slab, where the inside face of the wall was stepped back and formed.

Construction of the exterior concrete cofferdam, the base slab and walls in the boiler room was completed before general excavation below El. 5 was started. Even then excavation was confined to the center of the lot and was carried down to sub-basement subgrade at El. −15, leaving wide berms to support the cofferdam and boiler-room sheeting.

Corner bracing of steel (Fig. 1) was installed to permit the adjacent berms to be removed, and the lot was excavated to subgrade in the corners simultaneously with the center excavation. Exterior walls of the boiler room were braced with inclined shores reacting against the base slab, to permit removal of the cross lot bracing and completion of the center excavation to the interior boiler room walls.

Some of the piers for the row of columns near the toe of the berm were started from El. +5, before completing the center cut. This was done with Gow type caissons, belling them out at the bottoms in the hard sand, gravel and clay stratum to the required bearing area. Caisson shells were withdrawn as concrete was placed.

Some difficulty from caving was encountered in belling out. When the general excavation reached the stage where piers could be started from sub-basement subgrade at El. −15, they were constructed within wood-sheeted boxes, the piers being excavated to the full dimensions required for bearing areas.

Due to the effective seal created by the exterior cofferdam wall, unwatering of the site and excavation through the running-sand and boulder stratum was not difficult. There was no danger of loss of material or of lowering the water level under surrounding buildings and streets.

Following completion of the interior piers within the center cut, the 3-ft. thick sub-basement slab was concreted over that area. Vertical steel beams were embedded in the concrete around the periphery of the slab, to act as supports for inclined steel shores that braced the exterior walls (Fig. 6). The berm was removed in 20-ft. wide sections, and a second tier of struts installed below the sub-basement slab grade. Piers for the remaining columns were excavated and concreted, and the sub-basement slab extended to the cofferdam walls, the interior line of sheeting being burned off at the underside of the slab.

Pressure used in design

Loads to be carried by the temporary bracing system are shown in Fig. 4. Hydrostatic pressure was assumed from about the top of the blue clay stratum or El. +5, and the combined pressure of the clay and water was taken as equivalent to a fluid weighing 83 pcf. (lb. per cu. ft.), or to a water pressure of 63 psi. plus a soil pressure of 20 psf. This was derived from Rankine's formula $w \tan^2(45^\circ - \phi/2)$ in which the angle of friction of the blue clay was assumed as 28 deg. and its bouyant weight as 56 pcf.

Unconfined compression tests on samples of the blue clay indicated a cohesion strength of from 1,500 to 1,900 psf. However, the required

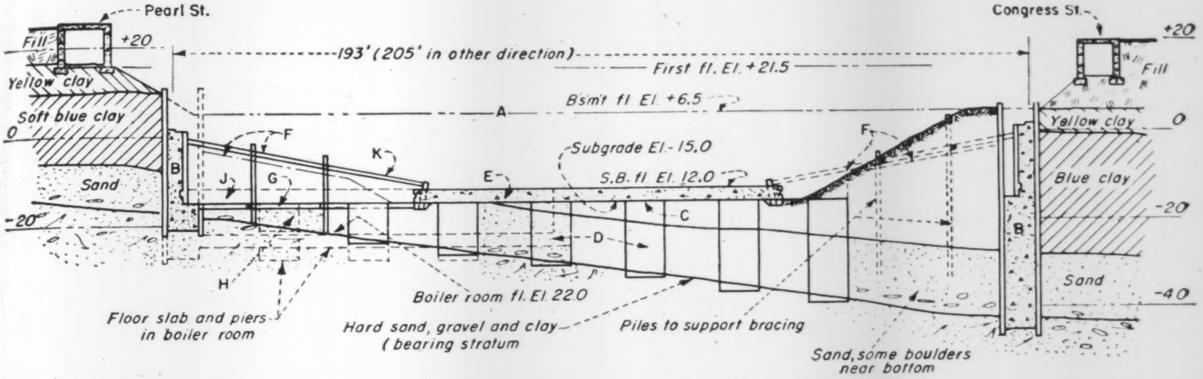


Fig. 6. Successive operations in excavation and support of the 20-story building are indicated by the following letters:

- ***A—Entire site excavated to El + 5.***
- ***B—Sheetpile cellular cofferdams around periphery, driven to bearing stratum and concreted.***
- ***C—Center excavated to El-15, leaving berms.***
- ***D—Central piers excavated to bearing stratum and concreted.***
- ***E—The sub basement slab concreted, with supports for bracing embedded.***
- ***F—Berms removed in slices and inclined shores installed.***
- ***G—Remainder of berm removed in slices and horizontal shores installed below subgrade.***
- ***H—Outside rows of piers excavated and concreted.***
- ***J—Sub basement slab completed.***
- ***K—Diagonal shores are left in place until permanent steel supports cofferdam walls.***

rigidity of the cofferdam wall, which could not deflect appreciably and which could not be permitted an inward movement sufficient to mobilize the shearing strength of the blue clay, made it necessary to disregard the effect of cohesion in figuring the pressure of the clay on the wall. Combined pressure of the sand and water also was taken as that of a fluid weighing 83 pcf. in which the angle of friction of the sand was 30 deg. and its buoyant weight 60 pcf.

In figuring resistance of the soil below subgrade level at El. —15. the support afforded by the soft blue clay was assumed as only the active pressure at rest, being 0.75 of its moist weight (110 pcf.), or a unit intensity of 82 psf. The available passive pressure of the sand underlying the clay was assumed at a unit intensity of 330 psf. as derived from Rankine's formula. Here the angle of friction was assumed as 30 deg. and the weight of sand, dry, as 110 pcf. (interior of cofferdam unwatered). Movement of the cofferdam wall required to mobilize the full passive pressure of the sand being small and the rigidity of the wall great, it was considered impossible for the soft blue clay, overlying the sand, to develop more than active pressure at rest.

The exterior cofferdam wall was concreted to the underside of the billet pockets, 5 ft. below finish basement floor. The upper part of the wall was reinforced to act as a continuous horizontal girder to transmit the earth pressures to the temporary inclined shores.

Bracing remained in place until the structural steel was erected and the basement and first floor slabs were concreted. The basement floor girders, which frame into the columns, have milled ends and act as struts to support the exterior cofferdam walls. (A following article describes the use of the permanent steel for cross-lot bracing.)

The structural frame of the building has been completed without settlement of surrounding buildings or streets, proof of the soundness of the method of installation.

The New England Telephone and Telegraph Co's building was designed by Cram & Ferguson architects and engineers of Boston. Moran, Proctor, Freeman & Mueser, New York City, were consultants to the general contractors, Turner Construction Co., and co-operated with the architects and engineers on the design and construction procedure of the foundations. Raymond Concrete Pile Co. was sub-contractor on the foundation. The Walter Reed Corp, of Boston did the machine excavation.

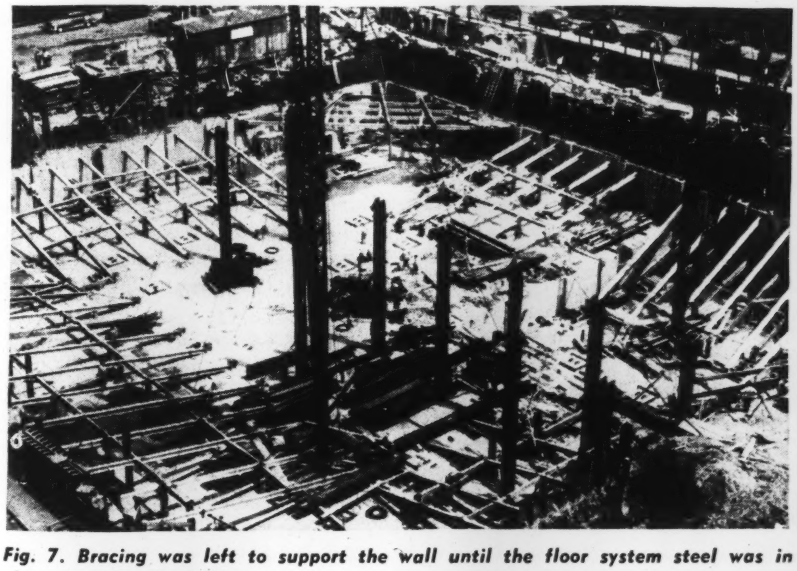
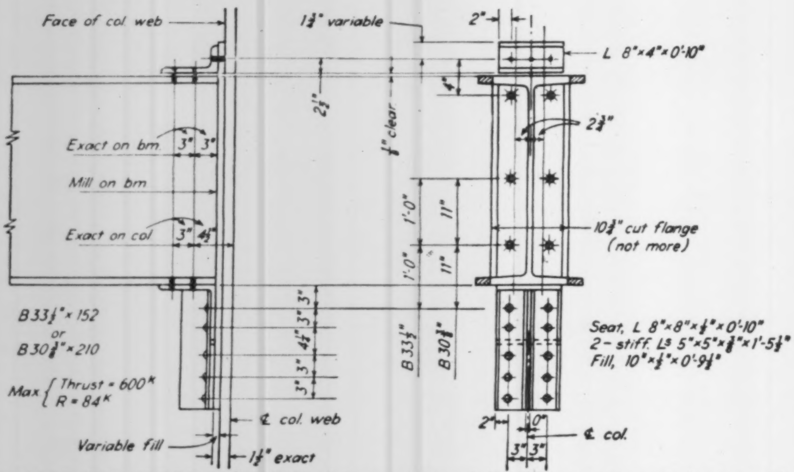


Fig. 7. Bracing was left to support the wall until the floor system steel was in place to take the load.



MILLED-END FLOOR FRAMING ***of basement and first-floor are erected as a unit for New England Telephone and Telegraph Building in Boston. The column web connection of basement floor framing is shown in detail***

Milled-End Building Framing Takes Thrust of Boston Soil

H. D. Gurney

Structural Engineer, Cram & Ferguson
Boston, Mass.

THE EFFECT of a hot summer sun on steel milled to exact lengths posed the central problem in erection of basement walls for the New England Telephone and Telegraph Building.

The 20-story structure occupies a plot 195x207 ft. bounded by Congress, Franklin, Pearl and High Sts. in downtown Boston.

Foundation walls are designed so that the thrust at the basement and first-floor levels is taken by floor framing that acts as cross-lot bracing. As this thrust is considerable, the contact ends of all beams are milled square to transmit a maximum of stress without use of unduly large connecting members.

To control the thrust during construction, the basement walls were built in short lengths inside a narrow cellular cofferdam around the periphery of the building. Thrust at the top of the basement wall was temporarily taken by diagonal bracing to the sub-basement slab. This work is described in a preceding article in this issue.

Interior building columns are on piers carried deep into the underlying sand and gravel strata, and brought to the sub-basement floor. Exterior columns are on base plates just below the basement floor level, some 13 ft. above the sub-basement floor which is laid on the compacted subgrade. The basement floor is supported on the structural steel framed into the exterior columns just above the base-plate. At the basement floor level a horizontal concrete girder takes the thrust of the top of the wall and carries it to the columns, which are spaced at about 20 ft. centers.

Because erection of the permanent steel was started in the hot month of July, considerable attention was given to temperature expansion in the steel, as affecting erection of the milled-end framing.

A so-called fixed point was adopted at the building corner of High and Congress Sts., and erection proceeded from this fixed point in a fan shape toward the building corner diagonally opposite. This method had the advantage of not locking up in the steel any large amount of stress due to temperature change as it allowed stress to "flow" in a predetermined direction.

Interior columns start from the sub-basement level and are erected in two-story units, with the splice just above the floor. Thus, erection of the column and framing of the basement and first-floor steel—the two levels that take wall thrust—was done at the same time. As rapidly as first-floor beams were erected, wood planking was placed to keep the sun off the steel.

The wall-column base plates on the High St. and Congress St. sides were grouted in place just in advance of the wale concreting, which started at the fixed corner and followed the same general pattern as the structural steel erection. Concrete was not placed until much later for the wale or the floor slab in the exterior bays on the opposite sides along Pearl and Franklin Sts.

Difficulties of setting the milled-end basement beams—due to lengthening from expansion in warm weather—became apparent as the erection proceeded away from the fixed starting point. Rivets to connect the interior columns to base plates at the sub-basement elevation were not driven until all column movement in the first tier of steel had stopped. This permitted a small horizontal shifting of the steel that acted to relieve the temperature stresses.

Steel forced into place

By the time erection reached the outer two bays along Pearl and Franklin Sts., the horizontal movement of the "free" columns had reached about ⅝ in. and the beams had to be forced into position. This was done by the hammering effect of dropping a weight handled by the erection derrick. Wood planking on top of the beams cushioned the blows so that no damage to the steel resulted.

Had the stresses resulting from the steel expansion been "locked up" by pouring the concrete wale along Pearl and Franklin Sts., the wale would have sheared off at the construction key in the interval between placing and final setting of the concrete. Thus, concreting was not undertaken until the steel framework was erected high enough above the first floor to eliminate practically all movement of the basement steel due to column action from temperature effects on the steel above. By waiting until this time of equilibrium had been reached before concreting the column base plates and making the final pours for wale and slab, no damage was done to the concrete by base-plate movement either during the time of temperature-expansion or the later time of contraction.

While the plan of steel erection for this building worked out satisfactorily, a slightly different scheme for erecting a similar type of framing might have been advantageous. Instead of locating the fixed point at one corner of the building, it might be put at about the center of the building, if no interference with other job functions resulted. Erection then could proceed outward in four directions. This would tend to lessen the total movement of the steel at the "free" ends.

Perhaps, also, slightly more clearance might be allowed for movement of the interior columns on their base plates. This last point is secondary, however, as column rotation in the story below the milled framing should accommodate any temperature expansion to be expected in a building of nominal dimensions.

Cram and Ferguson were the architects and engineers for this building, with the author in charge of structural design. Turner Construction Co. was the builder with G. M. Reaves as superintendent. Bethlehem Steel Co. furnished and erected the steel.

Notes on Legal Decisions

Summaries of decisions relating to construction prepared by I. Vernon Werbin, counselor at law and engineer, New York

Remedies When Contract Is Breached

Where full performance is prevented by the unlawful interference of the other party, the injured party may treat such wrongful act as a breach of contract and at once sue for the damages. Suit may be for loss of the benefits or *quantum meruit* for fair and reasonable value of the part of the work actually performed[1].

Where parties deviate from the terms of a special contract, the contract price will, as far as applicable, generally be the rule of damages. Where the contract is terminated by one party against the consent of the other the latter will not be confined to the contract price. He may bring action for a breach of the contract and recover as damages all that he may lose by way of profits in not being allowed to fulfill the contract. Or he may waive the contract and bring his action to recover the fair and reasonable value of the part of the work actually performed.

In the latter case he will not be allowed to recover as damages anything for speculative profits. He cannot assume the contract price as the true value of the work necessary to complete the whole job, and then recover the proportion which the work done will bear to the whole job, although it may amount to more than either the contract price or the actual value. This would be allowing indirectly a recovery for speculative profits upon the common counts.

If the party seeks to recover more than the actual worth of his work, in a case where he has been prevented from performing the entire contract, he must base his action directly on the contract[2].

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(1) Clifton, Applegate & Toole v. Big Lake Drainage Dist. No. 1, 267 P. 207; United States, etc. v. Zara Contracting Co., 146 F.(2d) 606.

(2) Clark v. The Mayor, etc. of New York, 4 N.Y. 338.

Damages for Breach of Contract

In all actions for damages for breach of contract the fundamental principle is full compensation for the wrong done. The general rule is that the compensation shall be equal to the injury, that such damages be allowed as—in the judgment of fair men—directly and naturally resulted from the breach of the contract[1].

A person who has violated his contract will not be permitted to reap advantage from his own wrong by insisting upon proof which, by reason of his breach, cannot be furnished. Neither can he escape liability because of the lack of a perfect measure of the damages caused by his breach.

Where a breach interferes with the performance of a contract in accordance with its terms the injured party may recover damages to the extent, at least, of any loss that was the necessary consequence of such interference. As a part of the damages sustained for breach of contract, anticipated profits prevented by the breach may also be recovered where properly proven.

Compensation is a fundamental principle of damages for breach of contract. The party who fails to perform his contract or interferes with or prevents the other party from performing it according to its terms, is justly bound to make good all damages that accrue naturally from the breach. The other party is entitled to be put in as good a position pecuniary as he would have been by performance of the contract. But, absolute certainty as to the amount of damages is not essential.

Where the claim is for damages for consequent injuries, a party cannot recover damages for a loss that he could have avoided with the application of reasonable diligence[2].

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(1) Needles v. United States, 101 Ct.Cl. 535, 618, 619 and cases cited.

(2) Henry Shenk Co. v. Erie County, 178 A. 662.

Unforeseen Conditions

In the absence of misrepresentation in a contract or a concealment of material information, a contractor usually assumes the risk of the increased cost of work resulting from encountering unforeseen conditions[1].

Where a party agrees for a stipulated sum to perform certain work, he will not be excused from performance or be entitled to additional compensation because unforeseen conditions increased the cost[2].

In another case the court commented that the mere fact that unforeseen conditions arise does not entitle one to additional compensation where he has agreed to do a certain piece of work for a fixed sum[3].

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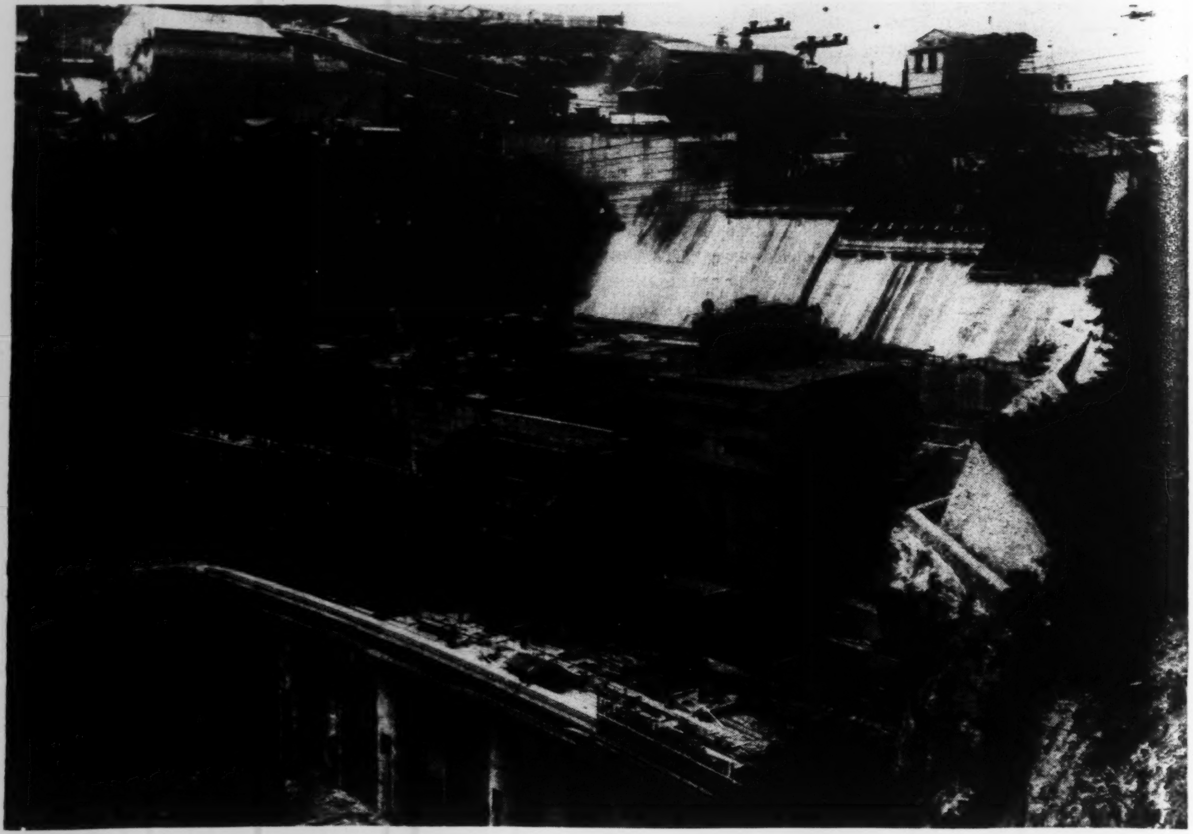
(1) Niewenhouse Co. v. State, 248 App.Div. 658, affd. 272 N.Y. 484.

(2) Maryland Casualty Co. v. Board of Water Commissioners, 43 F.(2d) 418.

(3) Sammons-Robertson Co. v. Massman Const. Co., 156 F.(2d) 53.



A PREVIEW OF MARSHALL PLAN CONSTRUCTION has been staged during the past two years at Genissiat on France's Rhone River, ending in the completion of • • •

Western Europe's Biggest Power Dam

Waldo G. Bowman

Editor, Engineering News-Record

Last March, as if to signalize the point and possibilities of the European cooperation program, which the U. S. Congress implemented with $5.3 billions of aid a month later, France turned water through the first turbine of its great Genissiat hydro plant on the Rhone River. Largest power dam in Western Europe, Genissiat is a truly French product. Not only was no outside aid, machinery, materials or money used for Genissiat, but its construction was beset with such a multiplicity of troubles and delays that the fact of its completion is almost as noteworthy as are its several special features.

The best way for American construction men to appreciate the French attitude toward Genissiat is to recall their own feelings about Hoover Dam. The pride and satisfaction we took in building our big dam, in its design innovations, and in the new magnitude of mechanization of its construction operations all had their counterparts at Genissiat. Perhaps, even, they are accentuated on the French work because the trying times and troubles that accompanied its construction gave the great Rhone dam a distinct place in the hearts of the people. During the past two years, indeed, sightseeing pilgrimages to the job were so numerous as often to hinder the progress of the work.

Genissiat, morever, is exceeded in size on the continent only by Russia's Dnieprostroy. Its contruction plant was mechanized beyond anything heretofore undertaken on the continent. And it can claim to a new concrete-placing record on the continent that does not suffer by comparison with many in the U. S.

Begun in 1937, work on diversion tunnels and cofferdams was completed and the river bed excavated by 1940, just in time to have the French army breach the cofferdams and flood the site in order to delay the Germans. Under German occupation, the French were permitted to resume work, but could only obtain men, materials and

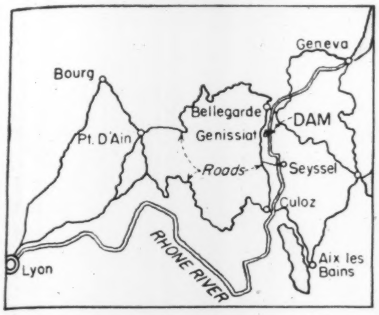

Geneva
Bourg
Bellegarde
DAM
Pt. D'Ain
Genissiat
Roads
Seyssel
Culoz
Aix les Bains
Lyon
RHONE RIVER

Fig. 2. Here is where Genissiat is, near Bellgarde, France, about 30 miles south of Geneva, Switzerland.

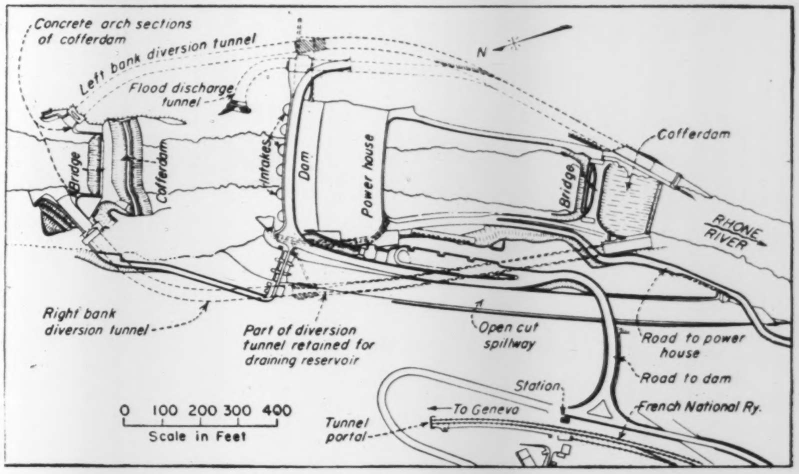

Concrete arch sections of cofferdam
Left bank diversion tunnel
Flood discharge tunnel
N
Cofferdam
Bridge
Cofferdam
Intakes
Dam
Power house
Bridge
RHONE RIVER
Right bank diversion tunnel
Part of diversion tunnel retained for draining reservoir
Open cut spillway
Road to power house
Road to dam
Station
French National Ry.
To Geneva
Tunnel portal
0 100 200 300 400
Scale in Feet

Fig. 3. Here is how it looks in plan, the dam and power plant forming a single structure that plugs a deep Rhone River canyon. It was built between two rock-filled cofferdams while the river was diverted through tunnels in either bank.

equipment by dangerous underground methods. By 1944, the lost work had been made up, the spillway excavated and about 65,000 cu. yd. of concrete placed in the dam and power house foundations—something, but not much to show for 7 years of effort.

Relative quiet settled over the job in 1945, and the time was used to assemble materials, repair the cableways and equipment that had frequently been damaged by sabotage and as frequently patched, and in addition to place a total of 130,000 cu. yd. of concrete. All of which set the stage for 1946 and 1947 when over 600,000 cu. yd. of concrete was placed to bring the job to completion.

Part of a great regional scheme

The Genissiat power project is a part, and the most important single element, of a great regional development scheme taking in the whole 300 mile length of the Rhone valley from Switzerland to the Mediterranean, and which, in some respects, has been likened to our TVA program. Involving power, navigation and irrigation, it is being carried out by the Compagnie Nationale du Rhone.

Though sponsored by the National government, the CNR was organized as a private company, a cooperative of the chief beneficiaries of the Rhone valley's development. Its four groups of stockholders, each of which owns one-quarter of the $2 million capital stock, consist of electrical distributing companies, railways, local governments along the Rhone, and local governments in the Paris region (the Seine Department), where a good share of the electricity will be consumed.

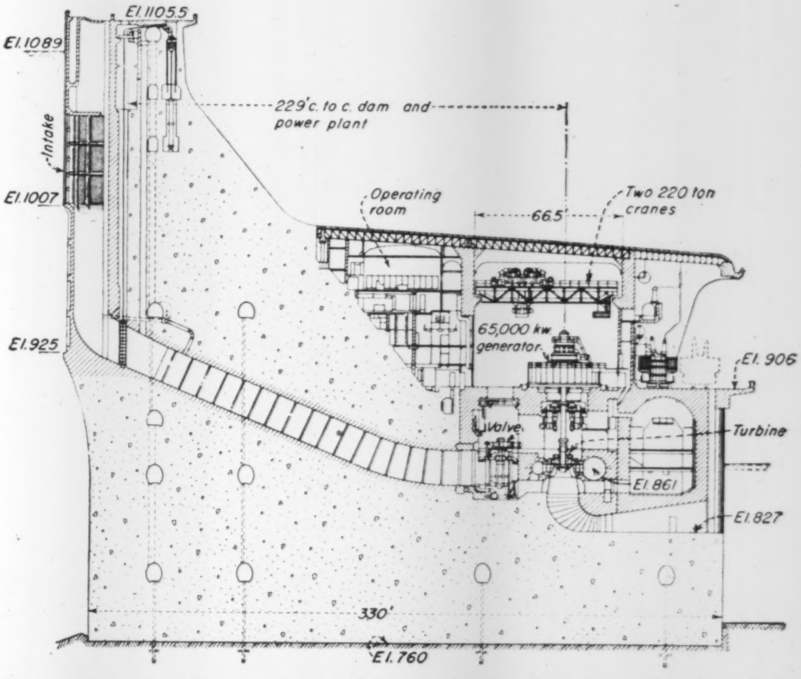

El. 1105.5
El. 1089
Intake
El. 1007
229' c. to c. dam and power plant
Operating room
66.5'
Two 220 ton cranes
65,000 kw generator
El. 925
El. 906
Valve
Turbine
El. 861
El. 827
330'
El. 760

Fig. 4. In section, Genissiat dam and power plant emphasizes the location of the penstocks and the 65,000-kw. turbo-generators of which there are to be six.

The national government's interests have been guarded by a government commissioner with veto powers (never yet exercised) over policy decisions. Accounts are watched by France's equivalent of the national comptroller general.

Two of the four share-holding groups has an option (already taken up, in the case of Genissiat) to buy one half of the electricity produced. Their interests are protected by clauses such as the one in the Seine Department's contract for Genissiat power, providing that the price shall be no more than the cost of power from a steam plant of latest construction.

All excess profits derived by CNR from sale of electricity are to be plowed back into improvements in the Rhone region. This follows the vision of the company's charter, which looks to the three-fold develop-

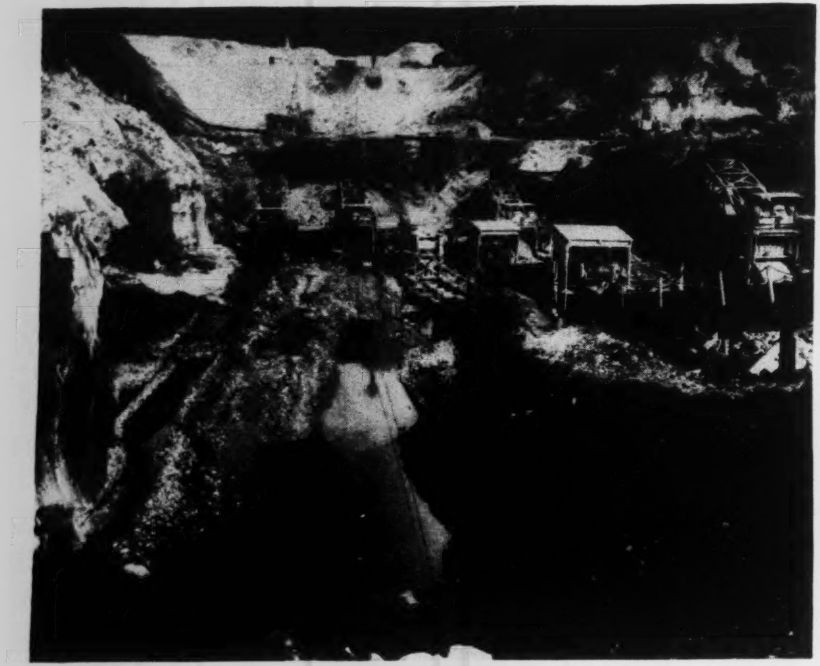


Fig. 5. Rhone River bed between two cofferdams was excavated, using shovels, slackline scrapers and belt conveyors.

ment of the Rhone for hydro-power, navigation and irrigation.

From its modest headquarters in an out-of-the-way Lyon apartment house, CNR has already issued about $50 million in government-guaranteed bonds to finance its undertakings. These funds will barely meet the cost of Genissiat so that other bonds are being issued as rapidly as possible to cover the second major project, already begun in the Donzere-Mondragon region 200 miles downstream. Here a 75-ft. high dam, 17-mile canal and high-lift lock is being built to cost about $140 million, the power output involved being almost as great as at Genissiat.

None of these funds represents government subsidies, though the company has been granted a few hundred thousand dollars for its non-power activities. Nor does the CNR get any state allocation for flood control, which is not in its domain.

Seventeen further canal-dam-power station projects are being considered by the CNR. Total Rhone power output, assuming 2.5 million kilowatts of installed capacity, would then reach about 13 billion kwh. a year, or more than half of France's present 23 billion kwh. electricity consumption, which is supplied about half by steam and half by hydro plants. In addition, the Rhone would become easily navigable and—the Rhone communities hope—the river might regain some of the traffic lifted from it by the railways. It is expected that these plans will take at least twenty-five years to realize.

Historically, the idea of CNR was written into law in 1921, but it took until 1934 to get the company fully organized. First borings at Genissiat were begun in 1935, and construction got under way only in 1938, as noted above. In the ensuing years since the company's organization, there has been a gradual disappearance of private shareholdings and dominance by the state. First the railways were nationalized, and the CNR stock owned by the local railway passed to the national railway company. Then, in 1946, the region's electricity companies, together with all others, were nationalized and their stock went to the national electricity company. Meanwhile, the Vichy regime had changed the makeup of CNR's board of directors to five members appointed by the state, plus one member from each of the four stockholding groups. This government dominance has been continued, and there is always the possibility that CNR may be taken over completely by the national electricity company, Electricite de France. So far, however, there are no definite moves that direction.

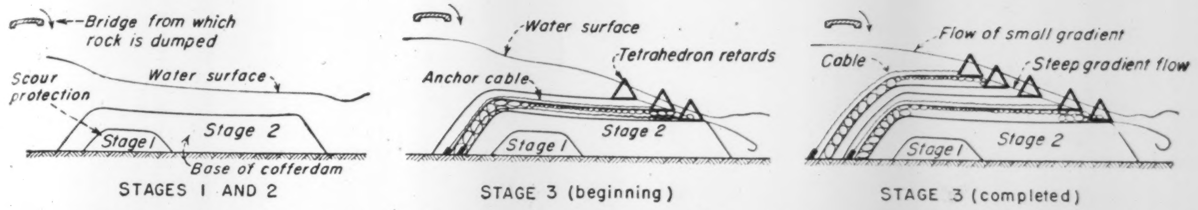
What Genissiat encompasses

Genissiat, as stated, is not only the first, but the largest and most significant of CNR's planned projects. It was chosen for first development because it offers the highest head and the best site and foundation conditions on the river. Moreover, its construction cost per kilowatt of capacity was about half that of the next best site at Mondragon. It is located, near Bellgarde, France on the upper Rhone River about 30 miles downstream from Lake Geneva in Switzerland. Set in a deep limestone rock canyon, it is a gravity-type structure, slightly curved in plan and built integrally with the power plant which extends entirely across the site at the downstream toe. Together, the dam and power plant required 875,000 cu. yd. of concrete.

The dam has a maximum height of 345 ft. and a length of 450 ft. The width at the top is 30 ft., and at the base, including the power house, is 330 ft. An open-cut spillway, for which 350,000 cu. yd. had to be excavated in the right bank, will handle a maximum flow of 95,000 cfs., and tunnels in the right and left banks will take an additional 21,000 and 45,000 cfs. respectively. This discharge capacity, plus what the penstocks could take, will handle a 180,000 cfs. flood, more than twice the largest on record between the year 1616 and the present. It is to be noted, also, that discharge over the top of the dam could be carried away over the roof of the power house.

In addition to serving for flood discharge, the tunnels, initially used to carry the river during the construction period, are arranged to drain the reservoir. For this purpose, they are brought to new upstream portals near the dam as shown in Fig. 3.

The Genissiat power house is designed for a capacity of about 400,000 kw. in six turbine-generator units. The foundations and the penstocks through the dam are complete, but only four 65,000-kw. units are contemplated initially. The fifth unit will be installed in 1949, and the sixth some time later. The turbines are of the vertical-axis Francis type



STAGES I AND 2

STAGE 3 (beginning)

STAGE 3 (completed)

*Fig. 6. **Cofferdam building in the swiftly running Rhone was accomplished by a unique method utilizing anchored tetrahedrons to stop the heavier stones and to slow the current so that the small material would be deposited before it floated downstream.***

operating at a speed of 150 rpm. Current, transformed at the site, will be sent out over the lines at 220,000 volts to as far distant points as Paris, and when the plant is fully in operation total annual output will be on the order of 1.8 billion kwh.

Placing the powerhouse entirely across the river, instead of in two halves on either bank, as at Hoover Dam, was only decided upon after weighing the two alternatives. For one thing it was feared that a bomb dropping between two powerhouses would cause great damage, which could be protected against by a very heavy roof over a single powerhouse; this fear was later held unjustified and the heavy roof slab omitted. Another reason for selecting the single powerhouse was that it improved the position of the penstocks over burying them in the abutment cliffs, although installing the pipes in the dam concrete proved costly and time consuming. Finally, a disadvantage of the type of powerhouse selected is that it does not permit of enlargement and, as a consequence, to secure the capacity desired, it was necessary to make the turbines of the maximum size that French industry can build. One can conclude that either type of powerhouse would have been satisfactory.

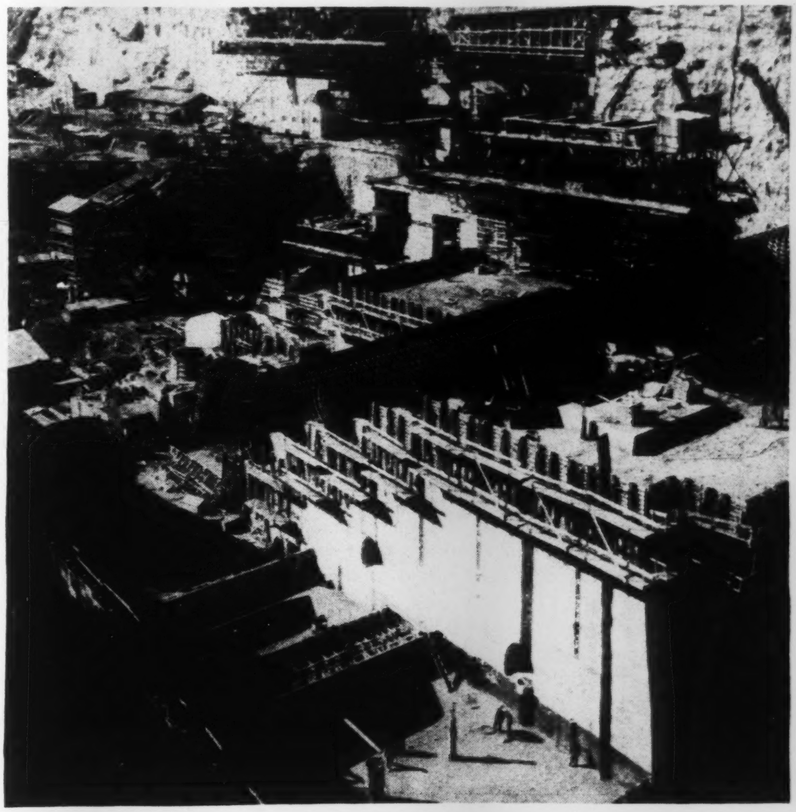


*Fig. 7. **Installing the heavily-reinforced penstocks in Genissiat dam. This was the stage of the work in March, 1946 when the high tempo of concrete placing began.***

It is in its construction features, however, that Genissiat is most notable, and these become of interest in the preliminary cofferdam building and extended right on through until the last 5-cu. yd. concrete bucket discharged its load from the cableway.

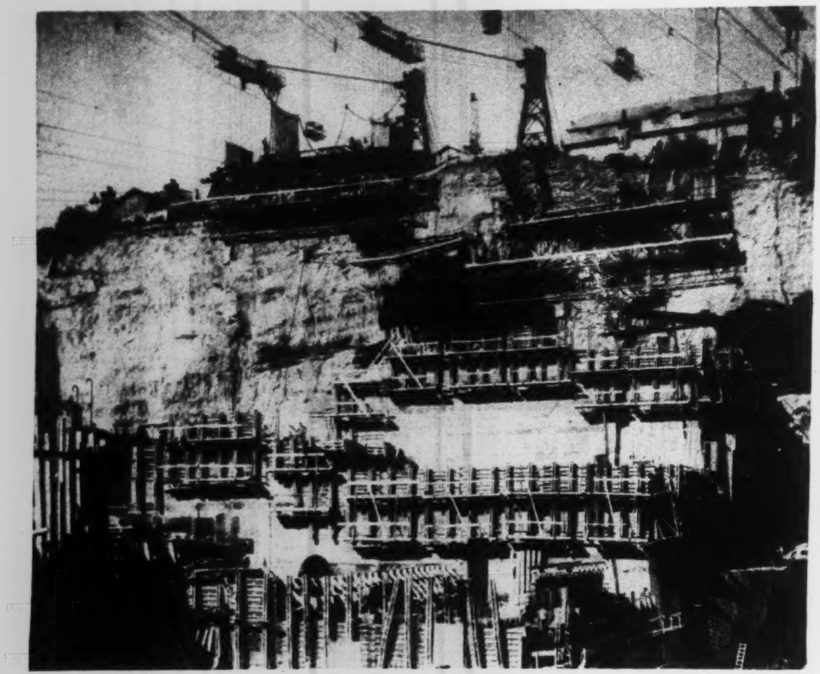
Cofferdams in swift water

To lay bare about a 1,500 ft. length of the bed of the Rhone River, in which dam construction operations could be carried on, was the first job that Genissiat's builders had to tackle. This meant that cofferdams had to be built at the upper and lower limits of the area and that diversion tunnels, each about 2,000 ft. long with an 861 sq. ft. horseshoe section had to be driven in the banks around it.

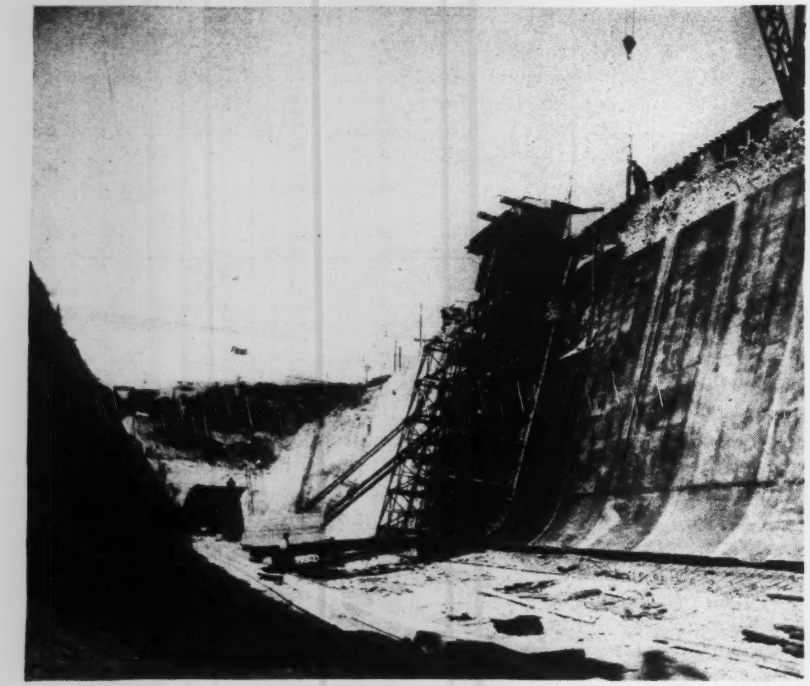
Cofferdam construction, being in swift water, presented the principal problem. It was solved in a spectacular manner, taking an idea originated by a Russian, Isbach, director of the Moscow Hydraulic Laboratory, and developing and perfecting it by model studies in the Grenoble hydraulic laboratories of Neyret-Beylier and Piccard-Pictet. It was in these same laboratories that American army engineers during the war carried out their model studies of the Rhine flood stages.

The idea on which the cofferdam construction was based, is to dump a fill of quarry-run rock in such a way that it will build up faster in height than it does in length. The principle employed is to slow the current enough by artificial retards that the smaller material is deposited more quickly than normally while the larger pieces, which have not already sunk to the bottom, are caught and held by the retards themselves. The deposit of larger material, since it has a rough surface, tends further to slow the speed of flow. In addition to building a fill faster, this procedure provides a more watertight fill by virtue of the smaller pieces filling the voids be-

FIG. 8. UNUSUAL CONSTRUCTION PLANT ITEMS AT GENISSIAT INCLUDED:



. . . . Suspended platforms to distribute the concrete.



. . . . Special forms for lining the spillway cut.

tween the larger pieces. Without the retardation of current much of the small material would be lost downstream.

The three stages or steps in underwater fill building by this method are diagrammed in Fig. 6. At Genissiat, material was dumped from bridges built at the site of each cofferdam. First the bed of the stream for its full width was covered with material of such size, compared with that in the natural bed, as to reduce the tendency to scour. The grading of this material was 0-110 lb. Next, the quarry-run material was dumped and let take its normal course in the current until a length of underwater fill was attained approximately that desired for the completed cofferdam.

At this stage, with the cofferdam at about half of its final height, the first retards, a row of framed tetrahedrons, were installed on the downstream edge of the fill. Built of steel angles, each tetrahedron stood about 7½ ft. high, and was anchored with steel cables to deadmen buried on the upstream slope of the fill. In practice the deadmen, heavy enough to sink immediately, were dropped from the bridge with the cable and tetrahedrons attached. The tetrahedrons floated downstream, coming to rest at the edge of the fill, because of predetermination of the cable length. A few heavy stones were dropped to weight the deadmen, and filling with quarry-run stones was resumed.

Now that the current was slowed, the smaller material settled out, and the larger was caught by the tetrahedrons. As soon as the fill had built up to the downstream slope desired, another row of tetrahedrons, farther upstream than the first was installed, and the process repeated. Eleven rows and 500 tetrahedrons were required, all used on the upstream cofferdom since the one downstream, being in quieter water, after the river was diverted, was built without artificial retards.

Models of the site on a 1:10 and a 1:40 scale were built in the laboratory, and miniature cofferdams were formed in running water just as they would be in the field. Dimensions, slope and volume of fill so determined were closely achieved in the river itself. The lengths of tetrahedron anchor lines were also fixed by the model studies, which were carried out with a volume of water corresponding to the estimated Rhone discharge at the time the cofferdams were to be built—about 11,000 cfs. This represents about 70 cu.ft. per foot width of stream, a concentration of flow that the French believe is unprecedented in a diversion operation.

The cofferdams, of course, were built entirely under water, their crests emerging when the gates in the di-

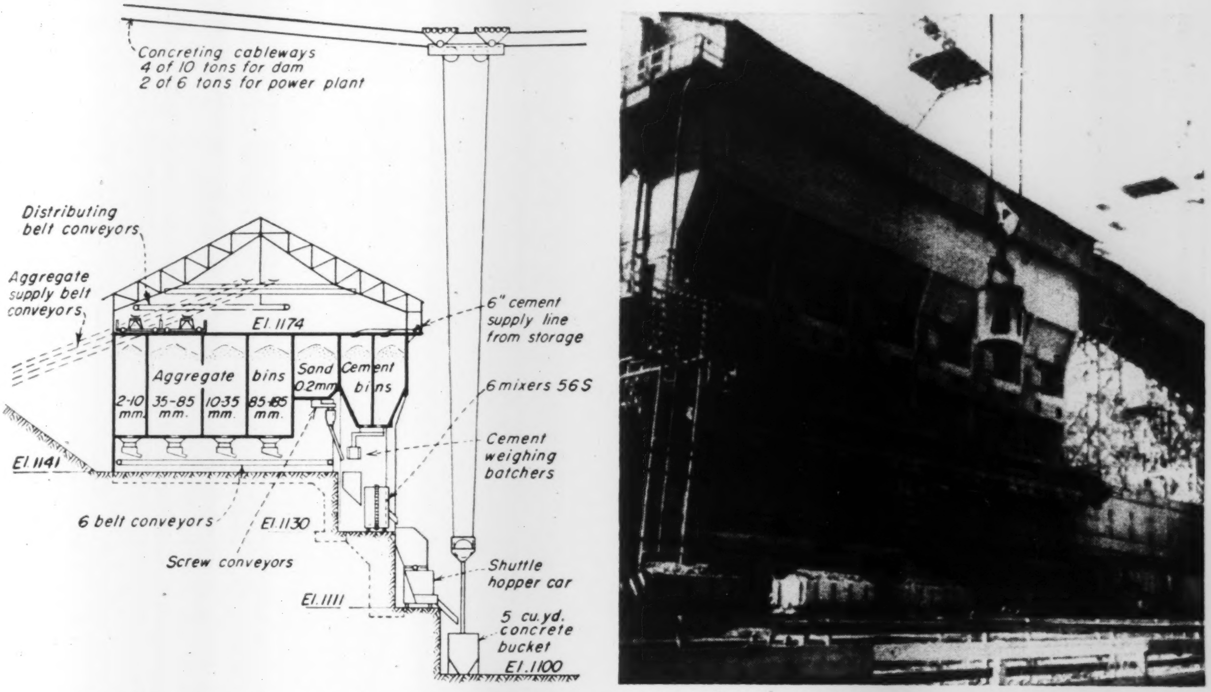


Fig. 9. Concrete mixing plant, built of reinforced concrete, had a capacity of 390 cu. yd. per hour. Cableway buckets dropped at base of plant were filled from a hopper car that shuttled back and forth under the six 56.S-mixers.

version tunnels were opened. At that time their height was 30 ft., their length 200 ft., and their width 165 ft. The cofferdams were completed by the driving of sheet pile cutoff walls into the alluvial bed of the river, which was 60 to 100 ft. deep at the site. Some sealing of the bed was also done by the injection of liquid clay-cement grout.

With the cofferdams in place and the river running in the diversion tunnels, excavation could begin in the dewatered site. About 100,000 cu.yd. were required to be removed from the stream bed and 240,000 cu.yd. from the abutments and foundation, but the digging and handling was relatively easy since the bed was sand and gravel and the abutments and foundations weathered limestone. In addition to the above, 80,000 cu.yd. more of rock had to be excavated later in final trimming of the abutments and foundations, bringing the grand total of excavation for dam and power plant, exclusive of spillway and tunnels, to 420,000 cu.yd.

In the prosecution of the initial excavations the mechanized character of the job was immediately established. On the benches, power shovels and industrial rail cars did the work, while in the bed of the river a battery of slackline excavators, discharging onto belt conveyors, removed the sand and gravel in a continuous stream. (See Fig. 5). Since these river deposits extended to a maximum depth of 100 ft., the excavation requirements were extensive if not difficult. And it was at practically the end of this job, in late 1940, when the French Army ordered the breeching of the cofferdams and flooding of the work to embarrass the Germans in some still-undisclosed manner. The subsequent dewatering and necessary cleanup, of course, added considerably to the sum total of the work.

Mechanization of concreting

It was in the mixing and in the placing of the concrete, however, that the French set new patterns for themselves in mechanization. In the prewar planning days, the use of American equipment had been contemplated. German occupation making this impossible, however, contracts were let to French manufacturers for as many machines as possible of American type and, for the rest, used equipment from other jobs was utilized.

Two fundamental requirements were laid down for building the Genissiat dam and power house: (1) the mixing plant and all auxiliaries would be located on top of the right bank, high above the work and accessible to road and rail transport; and (2) all concrete should be placed by cableway.

Stemming from the first requirement a large capacity washing, screening and crushing plant was established about 800 ft. upstream from the dam, (building at the right in Fig. 1) with a battery of working storage bins for the various sizes of aggregates between it and the dam and supplemental storage within earthen enbankments farther upstream. The different elements were joined by belt conveyors, which was also the means used to transport the aggregates to the mixing plant. The supplemental storage alone could provide for about 45,000 cu.yd. of four sizes of aggregates. The materials were supplied from a deposit across the river and several miles downstream (dug from the Rhone by six 70-ton per hr. draglines), and brought to the screening plant by two teleferics carrying lines of 0.9 cu.yd. buckets that gave them a capacity of about 200 tons per hr. each.

Cement brought in by rail was transferred by pump to a battery of

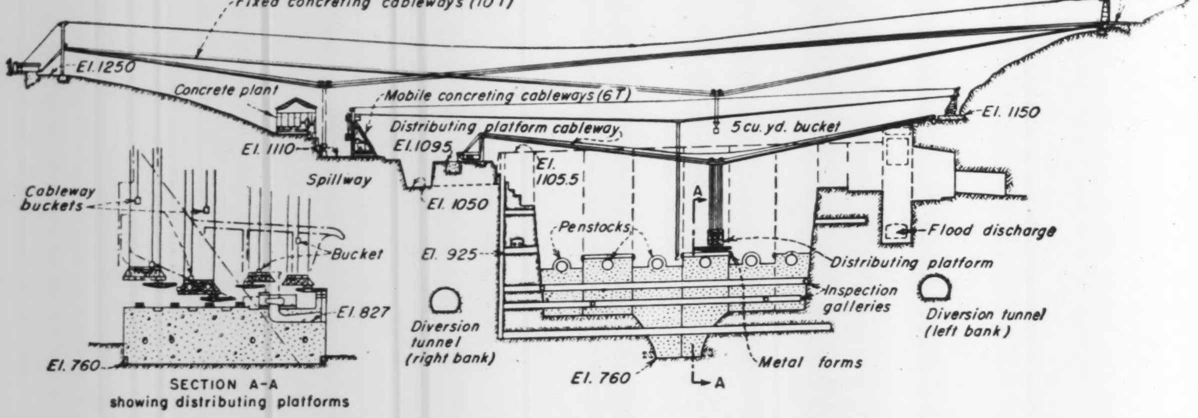


Fig. 10. Fourteen cableways were used in building Genissiat dam and power house. In addition to transporting concrete they were used to support concrete distributing platforms that could reach every part of the work.

four silos with a total capacity of 4,600 tons and located just downstream of the mixing plant. Storage for about 7,000 additional tons was also available in a nearby town.

The interesting characteristic of the cement silos was that their upper cylindrical portions were of steel, while the conical bottoms and supports were of reinforced concrete. The extensive use of reinforced concrete in the various elements of the construction plant constituted, in fact, the most striking contrast with American installations. The entire mixing plant was of concrete as were the aggregate storage bins.

The mixing plant itself (Figs. 1 and 9) had no precedent or counterpart in France. Designed for a capacity of 390 cu.yd. per hr., (which proved too high considering the limitations to progress imposed by form handling and concrete placement), it was equipped with six 56:S mixers set in a row along the front of the plant. Each mixer discharged into a twin-gate hopper below which a hopper car mounted on rails moved back and forth to receive the mixes and carry them to the cableway buckets, which were dropped directly at the foot of the plant. The layout of the plant, whose superstructure was divided into seven bins, for two cements and five sizes of aggregates, is shown in Fig. 9.

The cableway installation (Fig. 10) is likewise of major size. Four fixed-tower cableways of 10-ton capacity served the dam and two of 6-ton size, with mobile tail towers, covered the power house area. Two other 6-ton cableways, one upstream and one downstream of the dam, were used to move miscellaneous supplies and equipment. Buckets of 5 yd. capacity were used on the large cableways.

In addition to the bucket cableways there were seven others that spanned the dam area and carried concrete distributing platforms. Equipped with hoppers these platforms took the discharge from the cableway buckets and by means of belt conveyors mounted on and suspended from them distributed the concrete to the point of placement. If all the other claims to record breaking made for Genissiat should be challenged, one with respect to its cableways seems sure to stand up: on no dam ever built have so many wires and cables crisscrossed the sky (Fig. 11). Yet despite a seeming complexity, the plant worked with outstanding success. It had to in order to place as much as 3,400 cu.yd. of concrete in a single day, and nearly 400,000 cu.yd. in a year.

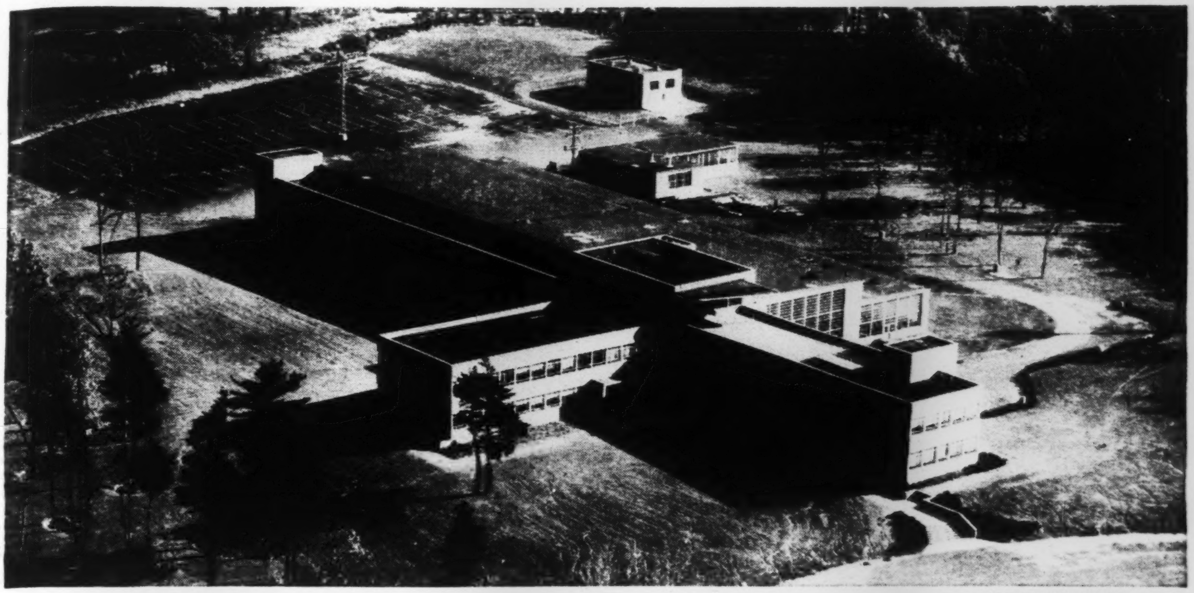
Much thought went into the type of cement to be used at Genissiat, in order to control the temperatures of the concrete. Although any type that was available finally had to be used, the original plans are nevertheless of interest. These contemplated the use of a finely-ground (3,000 sq. cm. of surface per gram) slag cement, with the stipulation that it should be stored in the silos for only a short time. For the interior parts of the dam about 55 lb. of slaked lime and 330 lb. of cement per cu.yd. of concrete were to be used to secure a dense and workable mix.

Some slag cement and some lime were available at times, but for the most part the specifications could not be followed. Nevertheless, the concrete is deemed satisfactory despite rapid placement and no artificial cooling. All concrete was vibrated.

The concluding element that contributed to the successful completion of Genissiat was the labor force, which at times of maximum activity totaled 3,000 men. According to the management, the 800 to 1,500 German prisoners, and numerous Italians, Spaniards, Arabs, Berbes and Indo-Chinese, as well as French, worked, with enthusiasm day and night except Sunday and in all kinds of weather. Earning only 40 to 55 francs per hour, (perhaps 20 to 30 cents) plus lodging, they nevertheless seemed to feel the importance of the job and exhibited great pride in it.

Project directors

So many have been connected with the planning and supervision of the Genissiat project that it is impossible to name them all. Prior to the war, M. Aubert was director general of the CNR, being succeeded in 1945 by Raymond Giguet, under whom the dam has been completed. P. Delattre, is technical director. At the dam George Gres was the engineer in charge, and M. Jannez was construction superintendent. The contract for the prewar preparatory work was held by the firm of Chagnaud, that for the actual building of the project to a group of nine contractors of which the two principals were Societé Generale d'Enterprises and Societé des Grands Travaux de Marseille.



Wigton-Abbott Corp. photo

Fig. 1. The Air Reduction Co. laboratory at Murray Hill, N. J., has a brick exterior and a welded steel frame.

Standardized Welded Connections Cut Costs for Research Building

La Motte Grover
Welding Engineer, Air Reduction Co.
New York, N. Y.

SAVINGS in time and money were effected through the use of standardized welded connections for the 580 tons of steel in the structural frame of the Air Reduction Co. Apparatus Research Laboratory. Some rather unusual welded details were also incorporated advantageously in the structure, where conditions necessitated special treatment.

Located at Murray Hill, N. J., and devoted primarily to research in the use of gases in joining and severing metals, the main building contains 78,000 sq. ft. of floor, with 53,500 sq. ft. on the ground floor. It is of two-story height, except for a cafeteria and sun deck on a third floor over the center portion. Floors are reinforced concrete and exterior walls are brick, with continuous steel-sash windows.

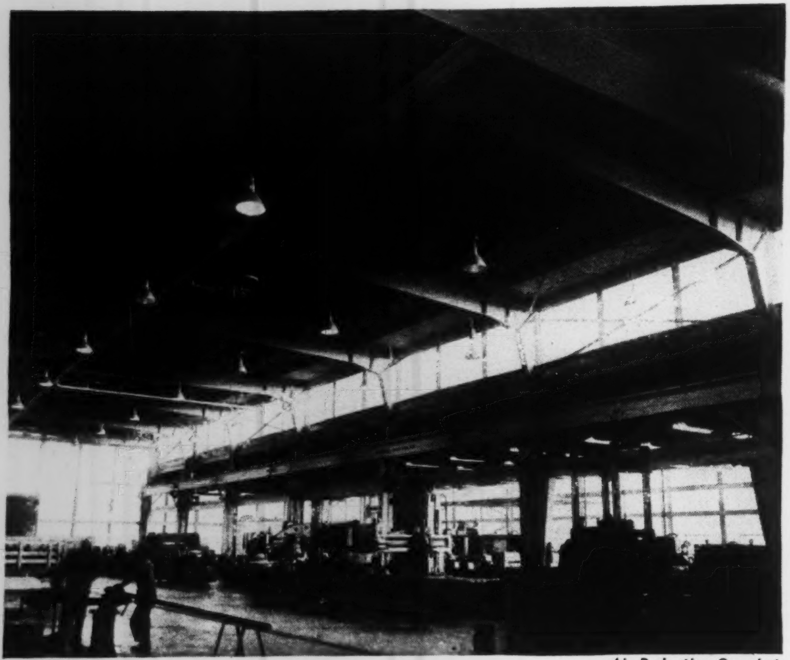
The laboratory is composed of a main or east wing, a north wing and a west wing (Fig. 1). The first is 306 x 141 ft., and its northern portion contains a 306 x 60-ft. shop bay, the roof of which is supported on rigid-frame bents (Fig. 2). This bay is divided in two by a fire wall. At one end is a 177-ft. long assembly laboratory, which is served by a 10-ton welded bridge crane, and at the other end is a hot-work laboratory. In the southern portion of the east wing are a well-equipped machine shop and several special-development laboratory and testing rooms. The rest of the wing is occupied by a library and laboratory rooms.

The 106 x 48-ft. north wing has a large drafting room, a blueprint room and a vault on the main floor. Above are administration offices and accounting and purchasing departments. In the 133 x 36-ft. west wing, both floors are occupied by offices, conference rooms and research study rooms with movable steel partitions. Fluorescent lighting is utilized in the drafting room and in all offices and small laboratories, but a combination of mercury-vapor and incandescent lighting is used in the high-ceiling shop.

Standard connections chosen

To produce a low-cost welded structural frame for this building, one objective in detailing the steel was dominant: to minimize the number of holes needed for erection bolts, to locate holes in comparatively small pieces of connection material and to place them in as few members as possible. By avoiding holes in heavy members, the cost of punching and extra handling was kept down.

To save time in design, provide duplication in fabrication and facilitate shop and field inspection, standardized welded framing connections were used wherever possible. These details, and many of the special ones also (some of which are shown in



Air-Reduction Co. photo

Fig. 2. The shop bay in the main wing. Its roof is carried on purlins supported on rigid frames, which also carry the inner ends of the machine shop roof beams.

Fig. 5), were taken from the "Manual of Design for Arc-Welded Steel Structures," compiled by the writer and published in 1946 by Air Reduction (briefly reviewed in *ENR* Nov. 14, 1946, vol. p. 669). For the most part, the form and arrangement of the special details lent themselves to graphical solution by means of diagrams contained in this manual, which take into account—without additional work on the part of the designer—some rather small eccentricities customarily neglected in riveted design.

The standard welded beam-end connections offer for most cases a choice of the following three types, listed in the order of preference from the viewpoint of economy: angle seats, stiffened T-seats and framing angles. Use of the last is especially undesirable for beam-to-column connections when extra handling and punching of heavy columns for erection-bolt holes is required.

Considerations in selecting details

It was possible to use seat-type supports for most beam-to-column connections for this building (Fig. 4). However, where beams frame into other beams, it was sometimes necessary to use framing angles because of insufficient clearance for a seat, or because of advantages to be gained by having all holes for erection bolts punched in one class of members.

The detail was selected on the basis of tests, which encourage a preference for connections with top angles welded only along the toes over those with side angles. Also, these tests show remarkably good performance for top-flange connection plates with relatively small cross-sectional area for use with beams assumed to be simply supported. There are very few, if any, beam-to-column connections in which the small amount of restraint introduced by a comparatively light top plate could be detrimental. On the other hand, such restraint generally increases the ultimate load-carrying capacity. For this project, therefore, top-flange connections were used where possible.

Air-Reduction Co. photo

Fig. 3. Seats were generally used for beam-to-column connections.

When a seat was utilized to carry the reaction of a beam, it was not deemed advisable to connect the web of the beam to the support. This rule was adhered to unless the arrangement was such that a suitable top-flange connection could not be used. In that case, flexible side clip angles were provided.

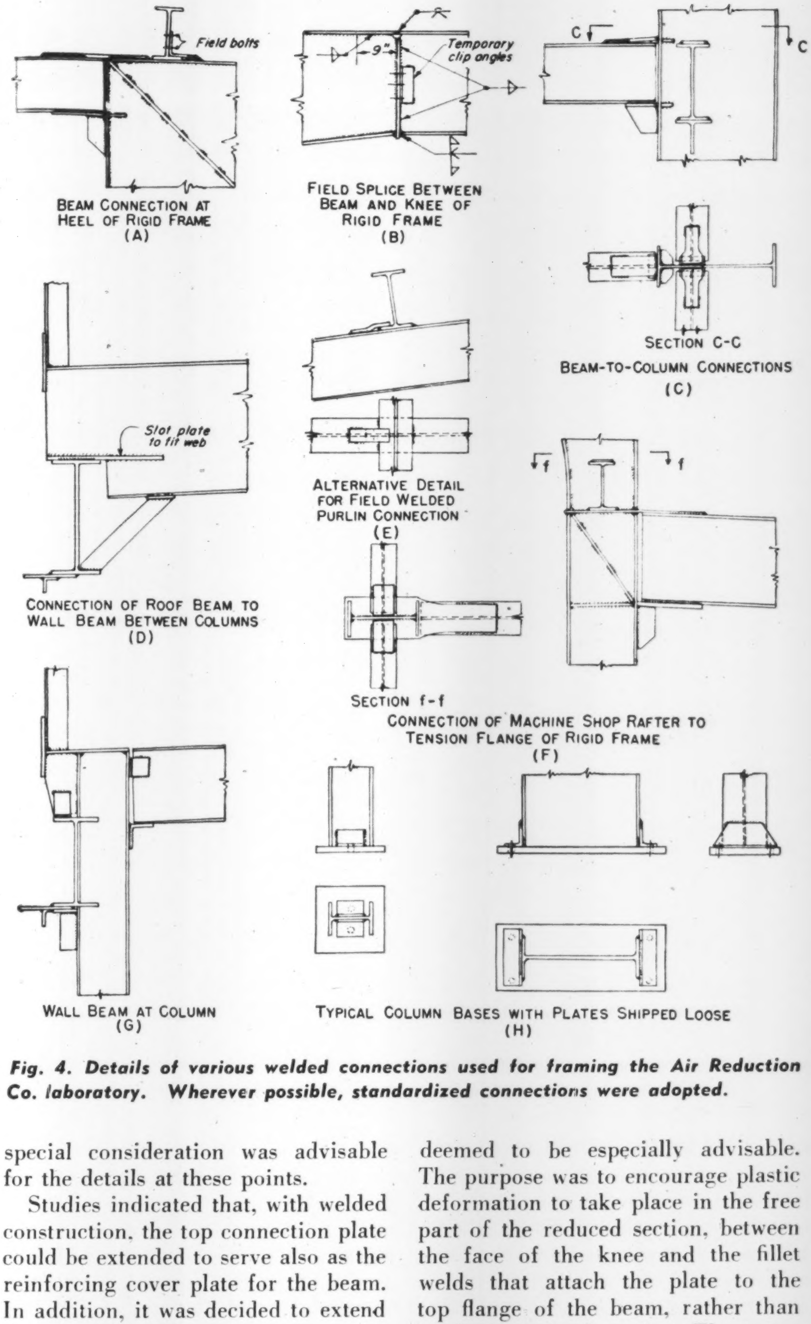
Butt-plate splices for rigid frames

The 60-ft. rigid-frame bents spanning the laboratory shop bay in the east wing (Fig. 2) are composed of rolled-beam crane-runway columns, rolled-beam rafters and knee sections built up from plates. The knees were shop-welded to the columns and field-welded to the rafters. Full-penetration butt welds were used to splice the tension flanges, and butt-plate splices connected the webs. The latter splices in some cases were extended to include the compression flange also (Fig. 4B and F).

A butt-plate web splice at the junction of the webs utilizes an interposed transverse stiffener plate of somewhat lesser width than that of the flange plates. Butted against this plate on either side, the webs are connected to it by means of fillet-welded T-joints. If the flanges are likewise butted against this plate, the flange plates are bevelled for groove welds.

The butt-plate stiffener for the rafter-to-knee field splice was welded to the end of the knee section in the shop. Also, to facilitate erection, a pair of clip angles, with erection-bolt holes punched in the outstanding legs to match holes in the butt-plate, were tack-welded to each end of the rafter (Fig. 4B). With this arrangement, all erection-bolt holes were punched in small parts that were easily handled.

At the lower end of one knee, the rigid frames support the inner ends of 40-ft. beams spanning the machine shop. The connections were designed to develop virtually full restraint (Fig. 4F). As a consequence, the beams required cover plates to sustain the negative end moments, using stresses permitted by the specifications at the time the design was made. Also, biaxial tension occurs at the top-flange connections, so that



BEAM CONNECTION AT HEEL OF RIGID FRAME (A)

FIELD SPLICE BETWEEN BEAM AND KNEE OF RIGID FRAME (B)

SECTION C-C

BEAM-TO-COLUMN CONNECTIONS (C)

CONNECTION OF ROOF BEAM TO WALL BEAM BETWEEN COLUMNS (D)

ALTERNATIVE DETAIL FOR FIELD WELDED PURLIN CONNECTION (E)

SECTION f-f

CONNECTION OF MACHINE SHOP RAFTER TO TENSION FLANGE OF RIGID FRAME (F)

WALL BEAM AT COLUMN (G)

TYPICAL COLUMN BASES WITH PLATES SHIPPED LOOSE (H)

Fig. 4. Details of various welded connections used for framing the Air Reduction Co. laboratory. Wherever possible, standardized connections were adopted.

special consideration was advisable for the details at these points.

Studies indicated that, with welded construction, the top connection plate could be extended to serve also as the reinforcing cover plate for the beam. In addition, it was decided to extend the top connection plate across the column to serve still a third purpose. At the shop-welded column-to-knee joint, a stiffener is required. Since the joint was located at the same elevation as the top-flange connection of the 40-ft. beam, this plate used as an interposed butt-plate welded to the column below and the knee above, could be used as the stiffener.

Because of the biaxial stress at this special connection, the use of a reduced-section top plate (Fig. 4F) was deemed to be especially advisable. The purpose was to encourage plastic deformation to take place in the free part of the reduced section, between the face of the knee and the fillet welds that attach the plate to the top flange of the beam, rather than in the restrained portion. The transverse fillet weld across the end of such a top plate, used in conjunction with the side fillet welds, not only reduces the required length of weld, but also provides a better distribution of stresses than longitudinal welds alone.

The beam seat for this connection is similar to the standard T-seat for the reaction to be carried. However, the horizontal element is extended to serve also as a bottom cover plate for the beam in the region of high negative bending moments. Instead of being cut from a wide-flange beam, the seat was fabricated from plate.

For all the other restrained beam-end connections of this project, the top-flange connection plates were shipped loose. Before being welded to the beam flanges, they were butt welded to the face of the column, using a small bar to back up the groove formed by the beveled end of the plate (Fig. 4C.) This detail facilitated the depositing of a thoroughly sound weld in the groove.

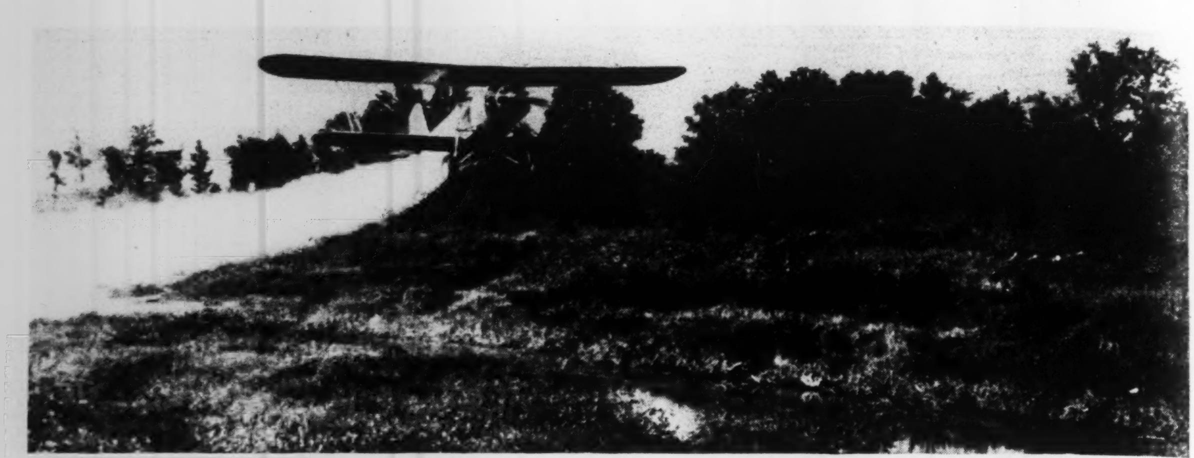
Purlin and wall-beam connections

To avoid punching the rigid-frame rafters for attaching purlins, a type of purlin connection that had been used previously in riveted construction proved to be suitable. The detail is shown in Fig. 4A. The lighter weight purlins, 12-in. WF 16.5-lb. beams were permanently field bolted to clip angles, which were welded to the rafters. The heavier ones, 12-in. WF 25-lb. purlins, which serve also as struts in the lateral bracing system, were bolted for erection and subsequently field welded.

Fig. 4E illustrates a type of lug or clip that can be welded to a rafter to old location during erection of a purlin that is to be field welded. This detail eliminates punching of purlins as well as rafters.

Spandrel beams, outside wall beams (Fig. 4G) and some interior beams were provided with so-called flexible-end connections, to conform with common practice in the United States. This practice may be changed eventually in view of the study that has been made in recent years of tier-building design by the plastic theory, utilizing rigid welded connections. It seems quite likely that the results of current programs of structural welding research in the U.S., if carried far enough, will lead to a large increase in use of such rigid welded connections. If so, there will be an accompanying increase in the overall cost savings afforded by the use of welding.

Wigton-Abbott Corp. of Plainfield, N. J., designed and built the Airco laboratory under the direction of the Engineering Division of Air Reduction. Steel was fabricated by the Ingalls Iron Works Co. at their Verona, Pa., plant and erected by A. J. McNulty & Co. of New York City.



U. S. Public Health Service Photos

Fig. 1. Low-flying airplanes apply DDT thermal-aerosol larvicide effectively and cheaply.

Mosquito-Control Practice With DDT

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***Contents in Brief**—When a revolutionary development occurs in any field, confusion as to its import, particularly in relation to established methods or practices often results. With the advent of DDT insecticides, such a condition now exists with regard to malaria control. Some engineers and others hold that use of DDT as a residual house-spray has outmoded all other methods of mosquito control. Others continue to apply oil on breeding places where DDT larvicide would be more effective and cost up to 90 percent less. This authoritative article presents some of the principles that underlie selection of control methods and insecticidal materials. The author has devoted 17 years to the study and practice of anti-mosquito activities with special interest in malaria-control engineering.*

USE OF DDT and the more recently developed synthetic organic insecticides—such as DDD—in mosquito-control methods has been two-fold. Killing of winged mosquitoes by DDT residual sprays (adulticiding) has become fully as important as drainage, larviciding and mosquito-proofing and the economy and effectiveness of larviciding has been greatly increased.

As adulticides, the principal significance of DDT and certain other chlorinated hydrocarbons lies in their long-sustained potency when used as wall sprays within buildings. Their chief employment against mosquito larvae is by recurrent application to breeding areas at about the same frequency as older larvicides (generally every 7 to 10 days).

The value of DDT as a larvicide has been obscured by the greater attention paid to its adulticidal properties. DDT larvicides not only help to maintain anti-larval methods in competition with adulticiding but also threaten to displace older larvicides. In addition, they have altered the competitive relationship between drainage and larviciding.

Control-method criteria

Variations in behavior of mosquito species affect the choice of control method. Many nuisance-variety mosquitoes common to the United States do not enter houses to an appreciable extent but bite man viciously out-of-doors. These species may prevent use of recreational areas. Application of DDT as a residual wall-spray is ineffective of course, in this case. Drainage or larviciding is usually indicated. As an exception, out-of-door spraying to fog the air temporarily or deposit residuals on resting places may be effective.

Among disease-transmitting species, infected mosquitoes may remain in houses temporarily or enter only infrequently. Others may spend virtually their entire lives within dwellings. The insecticidal effectiveness of residual wall-sprays is roughly proportional to the length of time a mosquito remains within a treated house.

Species-sensitivity of mosquitoes to insecticides varies. This is especially true of slow-acting sprays—such as DDT—where length of contact can be too limited for complete kill.

The flight range of different species, which varies from about one-eighth mile to as far as 10 miles, is another factor to be considered in selecting a control method. The extent of breeding areas affecting a community

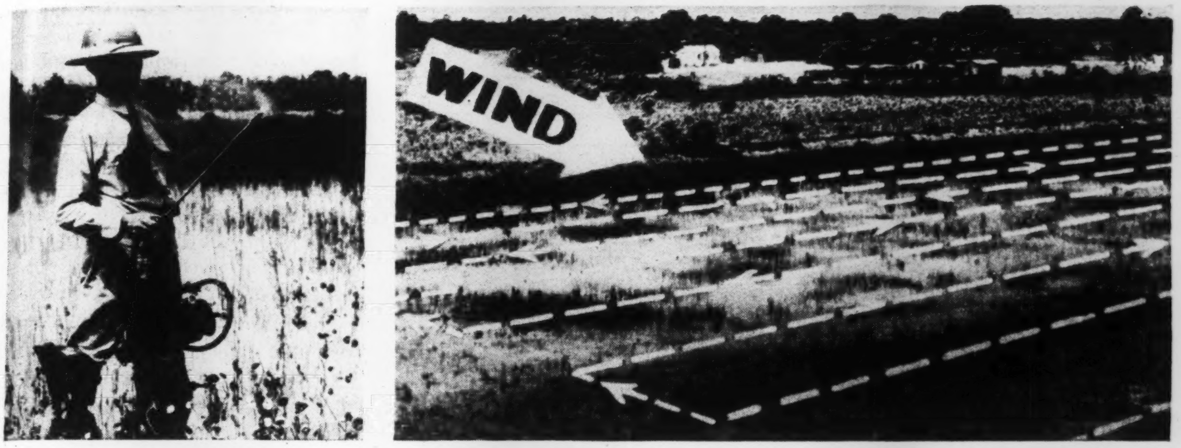


Fig. 2. With a fine-mist hand-sprayer, DDT larvicide is applied to shallow breeding areas by a worker walking along parallel paths (right).

might be expanded perhaps from one acre for a short-flight species to 10,000 acres for long-range varieties. Residual house-spraying with DDT tends to be more economical when long-flight mosquitoes are encountered, provided they are of a suitable type.

From another standpoint, the comparison becomes quite different. A single 100-acre marsh from which short-flight mosquitoes emerge might threaten only 50 people. But another species flying 10 miles from the same origin might affect 100,000 persons. In this case, larviciding would be more economical. Both of these cases are modified by other factors, including the area of jurisdiction of the mosquito-control agency.

The cost of DDT house-spraying depends, of course, on the number of houses to be treated. This factor tends to favor anti-larval methods in urban communities and adulticidal procedures in rural areas. Based on 100 acres of breeding surface, one urban and the other rural, a comparison of the estimated cost of adulticiding and larviciding in a northern state is given in Table I. This data has been compiled from actual costs applied to a hypothetical situation. It shows that urban house-spraying would be 125 times more expensive than larviciding but rural house-spraying would be only one quarter as costly as larviciding.

The effect of extent of breeding places on choice of control method can be appreciated by changing the breeding acreage in Table I. With 10 acres, larviciding would be more economical for both urban and rural areas. With 1,000 acres of breeding surface affecting a town of 5,000 people, the annual cost of house-spraying and larviciding would be $3,125 and $10,000, respectively. Thus spraying would be favored for this community.

TABLE I—SAMPLE COST COMPARISON OF DDT ADULTICIDING AND LARVICIDING

Item	Urban Area	Rural Area
Population	200,000	400
No. of Houses	50,000	100
Cost per Application of Residual House Spray	$2.50 ($1–5)	$2.50 ($1–5)
No. of Applications Annually	1	1
Total Annual Cost of Residual House Spraying	$125,000	$250
Acres of Breeding Surface	100	100
Cost per acre of DDT Larvicide Application	$1	$1
No. of Applications Annually	10	10
Total Annual Cost for Larviciding	$1,000	$1,000

TABLE II—COMPARATIVE COSTS OF LARVICIDES AND ADULTICIDES

	Cost per Acre-Application[2]		
Material	Hand	Power[1]	Airplane
Larviciding			
Fuel oil, 20 gal. per acre	$8.	$3.50	Not usable
Pyrethrum oil	5.	2.50	Not usable
Parisgreen			
10%, 1 lb. per acre	2.50	1.25	
20%, 2 lb. per acre			$1.00
DDT, solution-mist spray 0.05–0.2 lb. per acre	2.	1.	
DDT, Aerosols & fine sprays 0.1 to 0.2 lb. per acre		1.	.40
Adulticiding			
DDT, per house spray application (200 mg. per sq. ft.) Hand or power	$2.50		

Note: These are typical costs subject to wide variation in relation to suitability of breeding places for method of larvicidal application employed. House-spray application costs are affected by size and spacing of houses and efficiency of equipment. With all methods, wage scales and labor efficiency are major variables.

[1] Power equipment mounted in truck or boat.

[2] Labor and non-labor combined, including gang overhead but not overhead in higher echelons.

DDT vs. drainage

While drainage is still needed as a principal method of mosquito control, its general importance has been lowered by introduction of the DDT group of insecticides.

Where high densities of the mosquito vector or mosquito-borne disease exist, greater reduction in the vector population must be realized to accomplish disease control. Such high densities favor more efficient and dependable methods of control, even when more expensive. Formerly, this fact greatly encouraged drainage over larviciding and mosquito-proofing.

One example may be cited. At a temporary, tropical, wartime Army post, both malaria and its vector were high. As estimated life of the post was not over four years, larviciding was more economical than drainage and hence was adopted. However, reduction in vector population of about 80 percent by application of standard larvicides (supplemented by screened barracks and by malaria-discipline measures) did not reduce malaria. Malaria transmission was finally halted by draining 1,000 acres of breeding surface nearest the camp, leaving a much larger, distant acreage under larvicidal control. In this way a reduction in vector population of 95 percent was achieved.

Such need for drainage would be encountered less frequently today due to the development of DDT larvicide. Situations may be encountered, however, which require drainage or larviciding in preference to residual house-spraying to effect a sudden reduction of malaria, or to obtain adequate relief from a high prevalence of nuisance mosquitoes.

DDT vs. other larvicides

As larvicides, DDT and related compounds are generally more effective than oil or Paris-green and much cheaper than plain oil. These advantages, however, may scarcely be noticed in a small mosquito-control program involving only a few ditches and catch-basins, but great differences will develop on large-scale programs, particularly those with breeding places difficult to treat.

DDT, being a more versatile larvicide that can be applied at both long and short radii at ground level as well as by airplane, will reach many micro-breeding surfaces inaccessible to short-radius larvicides. Since most programs are limited as to budget, use of expensive larvicides tends to require omission of some breeding places from treatment and to encourage less-frequent treatment. Hence cost has an important bearing on adequacy of control.

When DDT and related compounds are applied by hand implements as mist-sprays, a radius of 30 to 70 ft. may be treated as compared with 10-20 ft. for coarse fuel-oil sprays. When access roads are available and air conditions favorable, DDT may be applied as a thermal aerosal by power equipment on trucks over an effective radius of up to 500 ft. as compared with about 50-75 ft. for power-sprayed plain oil.

Fig. 3. From a portable sprayer DDT in fine mist is wafted across a breeding area that cannot be waded.

Airplane application is economical

Where breeding acreages are large, application by airplane is the most economical of all methods (Fig. 1). Airplane application is feasible with DDT and Paris-green but not with plain oils. The radii of application and cost of Paris-green and the DDT group are closely comparable for hand and terrestrial application. DDT is effective against anopheline as well as nuisance mosquitos, which are largely unaffected by Paris-green. Applied by airplane DDT larvicide is cheaper than Paris-green because of the lower weight of larvicide distributed per acre.

With ground-level larviciding, savings in costs are accomplished principally by reduction in labor time rather than in cost of materials. With hand spraying, larvicides that can be applied at the longer radii (wider swaths) result in a proportionate reduction in time of larviciding and clearing of pathways in and around breeding places. Lower dosages result in less time required for: walking between application and loading points; filling equipment; and loading and unloading materials on supply trucks.

Use of power- and airplane-application methods, where applicable, further reduces overall cost. All of these factors favor DDT over plain-oil larvicide as shown in Table II.

Objection to DDT

One objection to the use of DDT as a larvicide is its high toxicity to fish and many other beneficial aquatic invertebrates. (Plain oil is also detrimental at conventional dosage rates.) Most breeding places of nuisance mosquitos in and about urban and suburban areas do not contain significant resources of these types, but there are occasional exceptions.

The recommended application rate of 0.05 lb. of DDT per acre for anopheline larvicide by hand spraying techniques rarely results in a significant wild-life hazard, but dosages required for the control of nuisance mosquitoes may range from this figure up to 0.4 lbs. per acre, as determined by species. The application of DDT at rates exceeding 0.1 lb. per acre by techniques that produce a high recovery rate of the insecticide at the water surface can and do result in significant damage to wild-life, especially where the water is shallow.

While more studies are needed, DDD (a DDT analogue) offers promise as a special-purpose larvicide in view of the more selective toxicity it appears to possess. In the laboratory one investigator (Tests with New Toxicants in Comparison with DDD on Mosquito Larvae and Fish, J. M. Ginsburg, *Proc.* 34th Annual Meeting, N. J. Mosquito Ext. Comm. 1947), found that DDD and DDT possessed equal toxicity to *Aedes aegypti* larvae, but that DDD was only one-eighth as toxic to goldfish. If this ratio can be maintained in the field, DDD can be applied with relative safety at rates (0.4 lb. DDD vs. 0.05 lb. DDT) that will control the more resistant species of common mosquitoes effectively.

In comparing DDT residual house-spraying and mosquito-proofing, distinction must be made between activities carried on by the individual householder and those performed on a community-wide basis. Given a choice between house mosquito-proofing and residual spraying by private action, the author would prefer mosquito-proofing. Residual sprays do not repel mosquitoes. Many mosquitoes may enter and bite, then rest on wall surfaces and die. Where house-frequenting mosquitoes are numerous, it is best to exclude the great majority by mosquito-proofing, and kill by DDT residual spray the few that enter in spite of the protection.

When disease-reduction work is carried by publicly financed community projects, residual house-spraying is selected as its cost is less than that for mosquito-proofing. Since most species tend to rest nearby after a blood-meal, the mosquito that has bitten an infected person within the house is apt to be killed. So far, none of the newer insecticides have been found to be as effective as DDT in residual toxicity against the mosquito.

DDT residual wall-spray also possesses other values in household sanitation which in themselves may justify its use. It is more toxic to the house-fly and bedbug than to the mosquito. It has substantial, but lower toxicity to roaches and some species of ants.

Characteristics of DDT spray

DDT is applied to residences in Xylene-emulsion or in kerosene-solution sprays at a rate of 200 mg. per sq. ft. of wall and ceiling surface. Under test conditions the freshly applied spray "knocks down" about 95 percent of mosquitoes that remain in treated rooms for as long as one hour (Test mosquito was the female *Anopheles quadrimaculatus*).

The killing effect declines gradually to about 30 percent at the end of four months and to about eight percent at the end of a year. A diminishing residual persists for about two years. All mosquitoes knocked down will die; but the total dying at the end of 48 hr. exceeds the percentage knocked down during the two-hr. exposure period. Re-application is commonly recommended every four months. Depending on the length of the mosquito season, one to three treatments may be required annually.

A number of factors have been found to reduce the length or amount of residual toxicity or the percentage of mosquito kill by DDT residual house spray. (The Comparative Residual Toxicity of DDT to Anopheles Quadrimaculatus When Applied on Different Surfaces, J. M. Clapp, R. W. Fay and S. W. Simmons, Public Health *Report* 62:5:158, Jan. 31, 1947 and Tests of the Effectiveness of DDT in Anopheline Control, S. W. Simmons, & Staff, *Ibid.*, 60:32:917, Aug. 10, 1945). These are in addition to the effects of faulty application techniques and ingredients, mosquito species and the normal evaporation of the DDT crystal on the wall.

Perhaps the most important factors are:

Absorption of the liquid insecticide by very porous surfaces inhibits formation of DDT crystals on wall surfaces where insects can come in contact with it. Poor results may also be experienced with slick surfaces due to run-off of the spray.

Mosquitoes may rest on untreated clothing which cover treated wall surfaces, or on, underneath or behind furniture and furnishings which have not been treated.

Factors of somewhat lesser importance are: The effect of rain on exterior surfaces; deposits of soot and grease from smoke; exudates from flies and other household coatings that appear to mask DDT particles; high temperatures that increase the rate of volatilization; and decomposition and human occupancy causing flaking of some paints to which DDT crystals are attached.

Conclusions are outlined

DDT residual house-spraying may be considered as the basic method of controlling or preventing malaria in rural areas and small communities where the work is partly or wholly carried out with public funds. Anti-larval methods are indicated only for the exceptional problem. Where private resources permit, mosquito-proofing at private expense, supplemented by DDT residual house-spraying, should be practiced.

Generally, anti-larval measures are basic for public projects to control malaria, yellow fever and dengue in urban areas, and abate nuisance mosquitoes. Depending on the circumstances, such measures occasionally may be supplemented by DDT residual house-spraying at public or private expense.

With anti-larval projects of considerable size and diversity of problem, both drainage and larviciding usually should be carried on in the project area. Drainage of ponds, swamps and marshes near built-up areas is particularly indicated.

DDT and DDD larvicides should virtually supplant all other larvicides. With salt-marsh mosquito control, use of DDT to kill newly emerged winged mosquitoes at breeding places may be found more economical at times than either drainage or larviciding, although all three methods have their place. Such application usually is by airplane. Although an adulticidal method, it is more closely related to larviciding than to other adulticidal methods, because treatment is performed at the breeding place.

MOSQUITO-CONTROL FACTS

Mosquito control is practiced for two purposes: To prevent or reduce mosquito-borne diseases and to obtain relief from annoyance. Malaria-mosquito control is widely practiced by counties in southern states in cooperation with state health departments and the U. S. Public Health Service. Nuisance-mosquito control is carried out in every state. Areas of particular activity include localities on the eastern seaboard from Massachusetts to Virginia and in Illinois, California, Florida and Utah. Annual expenditures range from $100 to as much as $200,000 per locality.

Control methods include drainage (dewatering by ditches, pumping, grading or filling), larviciding, adulticiding, and mosquito-proofing of dwellings. Drainage and larviciding are directed against the egg, larval and pupal stages of mosquito life. Adulticiding destroys the full-grown insect and mosquito-proofing erects a barrier between mosquito and human contact.

(See *ENR*, July, 1936, p. 118, "The Growth and Importance of Anti-Mosquito Work," Dr. L. O. Howard, the first in a series of ten articles on mosquito-control engineering.)

Construction-Worker Training That Works

Contents in Brief*—Montreal contractors, unions and the Quebec provincial government have jointly organized and are operating a six-month school for construction apprentices, and assisting the graduates to get jobs and advance to journeyman status. The school is conducted as closely as possible to an actual construction job—bricks are laid, walls are built and wiring is put into house frames.

MONTREAL has a construction-worker training program that works.

Sponsored by employers and unions jointly, it starts with six-months school training and follows with arrangements for regular employment on construction work as an apprentice. Intial training may be supplemented by night classes at the same school. Significantly, many journeymen are attending the night school to increase their knowledge and capabilities.

Courses now are offered in bricklaying, plastering, painting, carpentry, sheet metal, electricity, plumbing and heating. Courses in welding are to be started soon. In existence for 2½ years, the school has over 500 graduates and a regular day-school attendance of 160. Night-school attendance of apprentices seeking advanced training is about 275, while nearly 100 craftsmen are registered. How these are divided among the several crafts is shown in accompanying tables.

There are a total of 39 full-time employees at the school. All of the instructors are competent craftsmen, selected for their interest and ability in teaching young men. The staff is predominantly French-Canadian, as is all of Quebec, and instruction is in both French and English.

While at the construction-training school the embryo craftsman works five 8-hour days per week. Working conditions approximate those for construction workers in Montreal.

Actually, the school course is very much a construction job. Each worker taking bricklaying builds walls with different bonds, openings, arches and the like. A lean mortar is used so that it can be cleaned from the brick, but the brick are used only four times, since they lose the color and feel of brick with repeated use.

Plastering is done on the same basis. The students prepare and apply plaster in the way it normally is done. Most plastering is on wood lath, or on manufactured gypsum lath, both of which lend themselves fairly well to removal for reuse.

Every room in the school has several coats of paint. New decoration schemes are a daily occurrence as student workers are allowed considerable latitude in their painting courses. Paperhanging is taught with the painting. One of the things featured is what to do about old paper and old paint.

Carpentry has its own shops and "mock-ups" where the boys are taught finish and rough carpentry. "Houses" are built in the shops so that a real understanding of the extent of the carpentry job is quickly attained. Some joiner and bench work is done, culminating in completion of a tool box that the worker takes with him.

Activities in the other trades are similar. A large mock-up of the rough frame of a building serves as a practice area for plumbing and heating. Complete installations are made for plumbing, including water and soil-pipe connections. Pressure heating is carried out to the point of putting steam on the system. The sheet-metal trades cooperate on duct work and similar construction. On another building frame, young electricians install distribution systems and handle other wiring, all in strict accord with existing codes.

TABLE I—CLASSIFICATION OF APPRENTICES, MONTREAL TRAINING CENTER

	Graduates	Training	Total
Bricklaying	154	34	188
Plastering	38	16	54
Painting	38	13	51
Carpentry	89	43	132
Sheet Metal	38	15	53
Plumbing & Heating	56	17	73
Electricity	50	22	72
Total	463	160	623

TABLE II—CLASSIFICATION BY TRADES OF NIGHT CLASSES

	Advanced Apprentices	Journeymen
Bricklaying	54	
Painting	10	55
Carpentry	54	
Sheet Metal	46	34
Plumbing & Heating	73	
Electricity	29	
Total	266	89

Trainees have done a great deal to expand and improve the present 60,000 sq. ft. of space occupied by the school. A number of war-time temporary buildings have been made available. Foundations were constructed, the structures re-erected and complete facilities installed by the trainees.

Moving partitions or utilities is just practice in this school, so the structures are constantly being changed. The building of fire doors, cafeteria sinks, work benches and similar improvements are routine assignments.

Classroom work supplements the hand work but in general is treated as a discussion period. Workers are told why things are done as they are and encouraged to ask questions and make suggestions. Films form an important part of the instruction of the school. A few regularly used films, such as "ABC of Hand Tools" are owned. Others, up to a total of nearly 100, are obtained on a loan or rental basis.

To foster good citizenship and pride in craftsmanship, courses in sociology are given in the school, conducted by priests in predominantly Catholic Quebec. These courses are not required but have been made of such broad interest and value that they are quite popular with both the Catholic and Protestant trainees. Features include getting along with fellow-workers, marriage and other subjects.

The school is in session all of the year, classes in any subject being started whenever space is available and there are applicants. The school

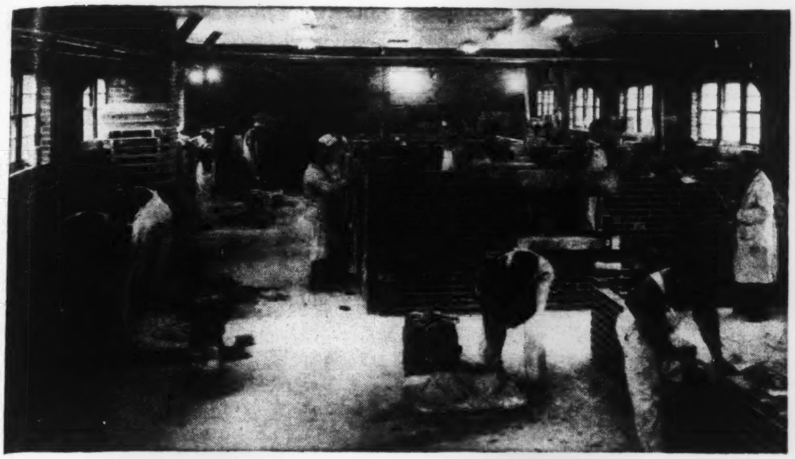


Fig. 1. Each apprentice in Montreal's school builds a section of wall and puts his name on it. The inside walls of the building also are practice structures, each section being laid with a different bond.

originally started in September (1945) and major groups still enroll at that time. That date has the advantage of completion early in March, just when construction is getting under way so that jobs are available.

Higher apprentice rating

The time spent in his school is counted in full as part of apprentice time. Examinations, both manual and mental, are conducted by the several trades at the close of the course. Examining boards in each separate trade are composed of equal representation of employers and unions. Each trainee is individually rated as to his capabilities in relation to what he might have learned on actual construction. Average seems to be recognition of a full year's apprenticeship value from the half-year study, but those with real interest and capabilities are rated substantially higher. Thus, the boys start at the second year or better apprentice pay rate. Additional night study may form the basis for further acceleration of apprenticeship time.

The school received its original impetus from war-veteran training, sponsored by the Canadian government. Seventy percent of the graduates of the school are veterans, compared to only 18 percent of those now in training. Despite some apprehension about continuing enrollment for such training, demand for admission has continued satisfactory.

Vocational guidance workers in Montreal high schools have directed many young men with proper aptitudes and interests to the school. Other apprentices have come from smaller towns throughout Quebec. The age specified for start of training is 15½ with a minimum of ninth-grade schooling. Top age is 23, but all regulations are somewhat flexible, depending on capabilities and interests. Average age of trainees now is lower, of course, than when enrollment was dominated by veterans.

The trainee receives no remuneration, but has no expenses in connection with the course, except his own subsistence. A cafeteria at the school provides nominally-priced meals. Most of the boys live at home, however, taking only a midday meal. Dormitories are a project for the future.

The trainee is encouraged to buy the essential tools of his trade, even to the extent that the school lends him the money. None has failed to repay the loan.

Interest of the school in the trainee does not end with completion of the course. A placement officer helps to arrange for each of the boys to get a job with a contractor where his capabilities will be best utilized. If employment is terminated or if a man is kept for too long on a particular class of work so that the practical training is not on a broad enough basis, the apprentice is assisted to make other contacts.

Comments of foremen who are directing the "graduates" of the school has been almost uniformly good. Most of the boys take greater interest in the work than those who have casually drifted into construction and seem to be well on the way to making the best of craftsmen.

Every trainee at the school has been encouraged to regard enrollment as the first rung in a ladder which can be made to lead to a place at the top of the construction industry. How well this idea has borne fruit is shown by the fact that more than half the graduates are now enrolled in advanced night courses to increase their skills. These courses are given five nights per week from 8 to 10 pm.

Most gratifying recognition of the value of the school and the quality of the instruction comes from registration for the night courses of men already rated as full journeymen. Such association is helpful for the apprentices and the fact that journeymen still want school help increases the value the young men put on the training.

Apprentice training

The school for apprenticeship training in Montreal is sponsored jointly by the Builders Exchange of Montreal and the Montreal Building Trades Joint Committee, the leading employer and employee groups in Montreal. They have had the assistance of the Department of Labor of the Province of Quebec. The work is carried on as "The Apprenticeship Commission of the Building and Engineering Construction Trades of Montreal," composed of equal representation of employers and unions.

The person who has taken the greatest interest and done the most to start and promote this apprentice training is the commission's chairman, J. L. E. Price, president of J. L. E. Price & Co., building and heavy construction contractor of Montreal and Toronto. The school is directed by A. E. Bourbeau, a professional engineer who has always specialized in construction work.

Money for the apprentice-training of war veterans has come from the Dominion Government at Ottawa. Money for the training of civilians has come partly from the Quebec provincial government and partly as grants from the Montreal Building Trades Joint Committee, a group that administers the local building trades collective labor agreement. Cost per apprentice to date is about $500.

Comment and Discussion

Readers' opinions on matters that concern engineers and contractors

More on Venturi Tubes

Editor's Note: The following letters from Charles G. Richardson and M. M. Borden, taking exception to certain assumptions of J. C. Stevens on a new type of Venturi tube (*ENR*, April 29, vol. p. 658), are two more critical statements on this important matter. Also published is Mr. Stevens' answer to an earlier discussion which appeared in the issue of June 10, vol. p. 973.

Sir—There are so many loose and incorrect statements in Mr. Stevens' article that it may be questioned whether the author is familiar with the design of standard Venturi tubes or with even a small percentage of the great number of calibrations which have been made during the past sixty years.

The implication, in the first sentence, that cavitation occurs in the throat of the "conventional" Venturi tube, is definitely misleading. Numerous pitot-tube traverses have clearly demonstrated that the velocity distribution across the throat is a straight line for a wide range of throat velocity. Hundreds of volumetric calibration tests of dimensionally similar and properly machined Venturi tubes, ranging in size from 2 in. to 9 ft. diameter, have demonstrated the remarkable agreement in the coefficient values.

Venturi tubes are often used for throat velocities up to 35 fps.; there are authentic records of tubes tested volumetrically at considerably higher rates with little effect on the normal coefficient. It should be observed that selection of a Venturi tube for any given installation is determined not by some limiting throat velocity but by the differential mercury capacity of the metering instrument with which it is to be used. Or, if the actuation is by floats on water columns, the hydraulic-gradient conditions determine the selection.

In the article, the illustration in Fig. 2 is entirely misleading; commercial Venturi tubes are not of the acute cone tapers indicated.

The article states incorrectly that the formula for flow through a Venturi tube is

$$Q = cK\sqrt{\Delta h}$$

The value of K is given as

$$K = \frac{\pi}{4}\left[\frac{2g}{1-\left(\frac{d}{D}\right)^4}\right]^{1/2}$$

The correct formula, using the value of K, is

$$K = \frac{\pi}{4}d^2\left[\frac{2g}{1-\left(\frac{d}{D}\right)^4}\right]^{1/2} \qquad (1)$$

(Reference: Handbook of Hydraulics, H. W. King, 1939, p. 474 McGraw-Hill Publishing Co.)

The more commonly used formula is

$$Q = c_r \times c_f \times \sqrt{2gh} \times a \qquad (2)$$

Q = rate of flow

c_r = inlet/throat ratio coefficient

c_f = friction coefficient

$c_r = \sqrt{\frac{r^2}{r^2-1}}$ where $r = \frac{\text{inlet area}}{\text{throat area}} = \left(\frac{D}{d}\right)^2$

h = differential head between inlet and throat

a = throat area $= \frac{\pi d^2}{4}$

Should the stream not fill the throat, its diameter is less than the throat diameter and it is obvious that, for any given differential h, a decimal coefficient must be applied to either equation (1) or (2) above to obtain the correct rate. The author's conclusion, therefore, that the coefficient in the formula must be increased, and his subsequent deductions, are obviously erroneous and of no value.

Next we read:

> "Another factor that must be considered is the pattern of velocity distribution at the two taps on the orthodox tube. This pattern directly affects the drop in velocity head. The improved Venturi meter maintains the same velocity distribution at both taps."

Having in mind that standard Venturi tubes have annular chambers at inlet and throat sections, with multiple communicating vents, one fails to see anything of significance in this statement except a further attempt to belittle long-established commercial products.

The author's conclusions regarding the effect of gate valves on a "2-ft. throat extension" are curious. As I read the conclusions, a gate valve so placed can be either 10, 50, 90, or even 100 percent open and the resulting coefficient will have an average value of 0.94. The demands for accuracy of Venturi tubes with valves in the down-stream cone are much more stringent than that.

A total loss through his 12x8-in. steel tube, having an outlet cone angle of 1 deg.-55 min., is given in Table II as 27 percent of the differential heads. This, as the author points out, is about double that for the 12 x 8-in. cast-iron tube, half as long. The value for Herschel standard tubes is 11 percent or only 0.4 of the permanent loss for the so-called "simpler" tube.

Quoting from the closing paragraph:

> "Cavitation may result in pitting. Its severity will increase as throat velocity is raised. This action can be minimized by designing the tube for relatively low throat velocities and using water in the manometer instead of mercury."

Apparently the author is again talking about the "simpler" tube. Can it be that cavitation even for medium throat velocities is anticipated? It has already been noted that his tables go up to only a maximum of 8 ft. differential; what happens when the differential becomes 20 ft. or more, as is frequently required for Venturi tubes? Must the new tube be designed, eventually, for using only a water manometer and low differentials? Most Venturi instruments require U-tube mercury columns for measuring pressure differentials.

There are many examples on record of Venturi tubes which have been removed after years of service and rarely is there any evidence of even slight pitting of the throat. For instance, a few months ago D. J. Purdie of our staff entered a dewatered 48-in. Venturi tube in the Newark, N. J. system. The following is quoted from his report:

> "The throat is of metal, and while the surface is not polished, it is as smooth as a piece of unrusted steel pipe. I believe that the size has not materially changed in all these years."

This Venturi tube was the second ever made: it was installed 57 years ago.

Charles G. Richardson
Vice President
Builders-Providence Inc.
Providence, R. I.

Sir: The title of the article, "A Simpler and Better Venturi Tube," implies that a way has been found to construct a Venturi tube that is more simple, economical and accurate than tubes produced by the Simplex Valve & Meter Co. and other established manufacturers.

Mr. Stevens indicates that Venturi tubes can be produced from standard flanged cast-iron short and long reducers in conjunction with special pressure-equalizing rings at the inlet and throat, the short reducers and throat ring being turned down to obtain a smooth approach section.

It is recalled that Allen Hazen constructed Venturi tubes for slow-sand filters by placing a cast-iron pipe nipple between the small ends of two cast-iron reducers and making the piezometer connections at the center of the nipple and in the pipe ahead of the reducer. This method of construction is, however, not desirable to meet the present day needs.

The hydraulic principle used in the Hazen form of Venturi tube as well as in the Stevens' combination is associated with an improvisation rather than a commercial production.

Under the heading of "Why the design is more accurate" it is stated that Venturi tubes "as built today violate an important hydraulic principle. The throat tap is usually placed in the center of the throat. At this point an inaccurate effect is registered even if several manifold connected outlets or an equalizer are used." Serious exception is taken to this statement and it is considered to be entirely unfounded.

Cavitation—Cavitation (to which Mr. Stevens refers) might be present in a Venturi tube under certain pressure and velocity conditions, for example, when there is no curved transition from the cone to the throat and where the cone has an angle as obtuse as that shown in Fig. 2 of the article. There is no such sharp angle change in the conventional Venturi tube made by this company. An ample radius joins the upstream cone to the throat cylinder which has piezometer openings in its center.

The presence of cavitation in a Venturi tube would be accompanied by marked oscillations of the differential head. Such oscillations in a properly designed tube are too slight to indicate that cavitation exists.

If pressure and velocity conditions are favorable in a Venturi tube, cavitation would probably occur at or near the outlet of the throat and with a properly designed tube and not at the point where the throat piezometer holes are placed.

Disturbances from cavitation or other causes should increase with high throat velocities but the coefficient curve has been found to be flat up to velocities greater then 100 f.p.s.

The nearly flat velocity profile present in the conventional Venturi tube is shown by traverses made in a 16-in. throat at the Alden-Hydraulic Laboratory (Edward S. Cole, Pitot Tube Practice, *Trans.* ASME, 1935, pp. 281-294). This profile does not indicate disturbed flow conditions.

Flat Coefficient Curve—In the article the coefficient-throat velocity curve (Fig. 7) for a Simplex Venturi tube starting at about 0.7 f.p.s. is compared to the flat coefficient line for the 12x8-in. tube "simplified tube starting at 2 f.p.s.

It is essential that the coefficient for the 12x8-in. tube be plotted to the lower throat velocities in order that a high grade, wide-range meter could be designed to suit the tube regardless of the form of curve. (The measurement of such low differentials requires a micrometer type of water manometer).

Coefficient curves for conventional Venturi tubes of the usual size range are normally flat for throat velocities above 4-10 f.p.s.

It is believed that the change of form of the coefficient curve for conventional Venturi tubes is related to the increase of pipe friction factor with low velocities. (W. S. Pardoe, Fluid Meters, Their Theory and Application, Part I, ASME special publication, 1937 and W. S. Pardoe, The Coefficient of Herschel type Cast-Iron Venturi Meters, *Trans.* ASME, 1945, pp. 339-344).

In addition, it is not believed that a throttling valve will affect the coefficient of a conventional Venturi tube when it is located two or more diameters downstream of its throat outlet.

Viewpoint of the Purchaser — The purchaser usually orders both the metering instrument and Venturi tube from one manufacturer and holds him accountable for the accuracy of both.

Based on size and throat-ratio data, Venturi tubes should be sufficiently accurate to enable the manufacturer to design integraters and recorders for any tube and to state error deviation closely. The group of curves for Venturi tubes made by this company and Builder-Providence Inc. shown in Prof. Pardoe's ASME paper is an example of such data. A similar set of curves might be constructed for other uniform-type Venturi tubes with sufficient rating data.

It is most desirable in commercial metering to build a Venturi tube to suit a standard instrument with a specific maximum differential head. Referring to the calibration curve with the discharge formula evolved from the Bernoulli theorem and the individual main and throat diameter of each tube, the so-called "improved type" of Venturi arrangement specifies that "the recording and totalizing meters are made to fit this calibration.

If the meter manufacturer were required to build different instruments for various coefficients, production would soon become a nightmare due to a great variety of instruments.

On the other hand, by maintaining specific differentials for the instruments with known flow relations for Venturi tubes, uniform production can be obtained by use of standard patterns and castings machined to established controls. Consequently, it is customary to size the Venturi throat so that its coefficient and maximum discharge are adopted to the pressure differential of an acceptable standard instrument.

Questionable Matters—It is stated in the article that the piezometer ring is placed adjacent to a machined reducer surface. This prompts concern as to the effect of later tuberculation upon the coefficient.

It also is noted that the throat piezometer ring is placed in the path of a conical stream which, it is believed, must involve an impact effect upon the differential head.

The use of annular piezometer rings is not new. Experiment and investigation for this company with annular piezometer rings, instead of piezometer holes leading to pressure belts, in conventional Venturi tubes have indicated variation and instability of the coefficient to the extent that use of such rings was considered unwise.

Attention is drawn to Figs. 6 and 8 of the article and the fact that the coefficient curve passes between plotted points. Accuracy is best insured when the coefficient passes through test points (Fig B, *ENR* June 10, p. 111).

While the contents of Mr. Stevens' paper present interesting reading, they cannot be considered as conclusive. This company has considered Venturi tubes similar to the design shown by Mr. Stevens as well as many others that employ annular rings but results of accurate tests on many tubes of various types, sizes and ratios at the hydraulic laboratory of the University of Pennsylvania, made under impartial expert supervision, indicate that the present design is, in its overall aspect, the most desirable to use.

Despite criticism in the article, the laboratory work, as it continues, tends to confirm and establish the dependability of our present design of conventional Venturi tubes. All of these tubes are homologous and follow Herschel proportions in parts related to flow measurement. The downstream cone outlet angle is related solely to loss of head due to the presence of the Venturi tube in the pipe line. This is related to economy rather than to accuracy.

As water is such a valuable commodity and increasing cost to deliver, it should be measured by those means which possess the greatest assurance of initial and continued accuracy.

M. M. BORDEN
Engineering Consultant
Simplex Valve & Meter Co.
Philadelphia, Pa.

Sir: Prof. Pardoe always rises to any bait labeled "Venturi Tubes". I am very glad to answer the points raised in his letter (*ENR*, June 10, vol. p. 973).

In this case the "urge to produce a cheaper and better Venturi tube" has yielded results. In Fig. 2 of the article, the illustration of a "Conventional Venturi tube" is merely an exaggeration of the conditions that exist in any Venturi tube; it merely illustrates a hydraulic principle which I am sure Prof Pardoe is not unwilling to admit.

I do not believe hydraulic engineers are looking for any metering device that has zero error even if it could be obtained. If a "Simpler and Better Venturi Tube" can produce results within 2 to 3 percent, I shall be quite satisfied and I am sure it will be accepted by the profession considering the saving in cost.

My experience has been that in spite of the precise laboratory calibration where "every point is within 0.1 percent," Venturi tubes in actual service seldom produce results closer than 2 or 3 percent, and that is accurate enough in the field of practical hydraulics.

J. C. STEVENS
Consulting Engineer
Portland, Oregon

Marine Borers and Concrete

Sir: The second of the series of articles by Robert D. Chellis on "Finding and Fighting Marine Borers" (*ENR* March 18, 1948 Vol. p. 422) contains the following statement:

> "Pholadidae are widespread, and their ability to bore quite hard rock is interesting. They have not done a great deal of damage to sound concrete containing hard rock aggregate. Over half the concrete-jacketed piles in San Francisco in 1922 were attacked, one-fifth badly, but the concrete was generally cement mortar poured around the pile in forms after driving, and would be considered poor by present standard, although some was quite hard."

The writer was a member of the San Francisco Bay Marine Piling Committee from the beginning of its activities in 1921 until the completion of its final report in 1927. During that time a comprehensive study was made of the marine borer problem, particularly in the San Francisco Bay area, and incidentally at other points on the Pacific Coast. The only cases of attack by *pholadidae* which were discovered were in cast-in place mortar jackets on deteriorated timber piling in Los Angeles Harbor. As stated in various reports of this committee, these jackets contained no coarse aggregate, and the sand used in the mortar was so fine that approximately 93 per cent passed the 50-mesh screen.

With respect to the statement that while the mortar would be considered poor for our present standards, some was quite hard. The report of the committee states as follows: "The hardness of the mortar was such that a sample of the best mortar in which the borers were found could be readily cut with the thumb nail."

It would be interesting to know where Mr. Chellis secured his information and also if he has any data regarding attack by *pholadidae* on sound concrete containing hard rock advocate. Precast concrete pile jackets in San Francisco port facilities, after a service life of more than thirty-six years, show no evidence of such attack or of deterioration of any kind.

FRANK G. WHITE
Chief Engineer
Board of State Harbor Commissioners for
The Port of San Francisco
San Francisco Calif.

EDITORS NOTE—Mr. Chellis informs us that his article mistakenly referred to San Francisco in discussing borers in concrete. The location of damage from *pholadidae* should have been given as Los Angeles and San Pedro, as Mr. White points out.

Selecting Economical Beam

Sir: William P. Stewart is to be commended for his efforts in producing the table for economical selection of beams, which appeared in *ENR* March 18, vol. p. 438. However, there appears to be some doubt that the section obtained by Mr. Stewart's method is invariably the most economical.

For example, to determine the economical wide-flange section for use as a beam subject to a maximum moment of 80 ft.-kips with laterally unsupported length of 26 ft., $S' = 80 \times 12/20 = 48$ and $S' L = 26 \times 48 = 1{,}248$. The first value of SL_u exceeding 1.248 is 1,290, provided by an 18 WF 55 of more than ample section modulus. The three succeeding beams are lighter and provide sufficient S. The 10 WF 49 is the most economical, although fourth in line.

JOHN H. ROGERS
Toronto, Ontario

UNIT PRICES BID BY CONTRACTORS

Floodwall and Appurtenances, Omaha, Nebraska

OWNER: U. S. Engineers, Omaha, Neb.; Col. L. W. Prentiss, engineer.

PROJECT: Construction of concrete cantilever type floodwall on compacted earth foundations; concrete I-type floodwall on steel sheet piling; and cut-off wall for flood protection along the Missouri River at Omaha.

CONDITIONS: All materials to be furnished by contractor. Access to job site is available by rail, highway and water. Job to be completed Nov. 15, 1948. Stipulated labor wage rates per hr. are: skilled labor, $1.25 to $1.52; semi-skilled, $1.25 (average); and common, $.85 and $.90.

LIST OF BIDDERS: (*Contract awarded March 17, 1948.)

1.*Parsons Const. Co., Omaha, Neb	$922,920.60
2. Korshoj Const. Co., Inc., Blair, Neb	936,860.75
3. Condon-Cunningham Co., and Peter Kiewit Sons Co., Omaha, Neb.	1,047,793.50
4. L. B. Strandberg & Son Co., Chicago, Ill.	1,099,611.70
5. Francis R. Orshek, Inc., Fremont, Neb	1,178,924.84
6. Bushman Const. Co., St. Joseph, Mo.	1,633,988.40

			Unit Prices	
Item	Quantity	Government Estimate	(1)	(2)
1 Unclassified excavation	16,320 cy	$2.10	$4.42	$4.28
2 Common excavation	2,600 cy	0.90	5.25	2.76
3 Structural excavation	1,770 cy	3.58	11.10	6.20
4 Impervious backfill	17,000 cy	1.85	2.17	2.32
5 Dewatering	lump sum	4,919.78	8,500.00	8,142.00
6 Concrete, class B	7,220 cy	44.54	46.70	50.00
7 Steel reinforcement	853,750 lb	0.114	0.1125	0.10
8 Furnishing steel sheet piling, 38 lb. type	58,414 lf	3.32	3.38	3.45
9 Driving steel sheet piling, 38 lb. type	51,180 lf	0.84	0.935	0.42
10 Steel sewer line, 3", intercepter "C"	12 lf	8.54	30.50	23.40
11 V. C. sewer line, 8", intercepter "B"	184 lf	12.39	3.25	40.85
12 V. C. sewer line, 12", intercepter "C"	12 lf	9.62	22.00	45.80
13 V. C. sewer line, 15", intercepter "C"	118 lf	8.44	16.80	34.15
14 C. I. sewer line, 16", Mason Street	40 lf	31.79	28.50	27.30
15 V. C. sewer line, 18", intercepter "A"	816 lf	10.85	19.55	31.20
16 V. C. sewer line, 18", intercepter "B"	150 lf	13.75	31.30	49.20
17 Soil cement sealer	25 cy	41.36	43.50	66.72
18 Standard manhole and catch basin	15 ea	337.81	307.00	745.00
19 Additional depth of standard manhole and catch basin	79 vf	48.87	53.00	65.45
20 Special manhole, douglas street	lump sum	817.02	810.00	1,146.00
21 Special manhole and catch basin, intercepter "C"	lump sum	1,104.18	868.00	1,152.00
22 Headwall, Mason Street sewer	lump sum	372.31	225.00	300.00
23 Valve box, Mason Street sewer	lump sum	2,126.89	2,723.00	4,000.00
24 Replacing pavement	20 cy	36.68	33.00	75.00
25 Omaha Public Power District water intake crossing	lump sum	14,663.30	16,048.00	13,100.00
26 Leavenworth street sewer crossing	lump sum	5,943.52	5,598.00	2,200.00
27 Telephone cable sleeve	3 ea	194.50	523.00	240.00
28 Guard for exposed water stop	10 ea	11.20	27.00	180.00
29 Gate structure no. 2	lump sum	4,230.79	3,918.00	3,800.00
30 Gate structure no. 4	lump sum	6,348,92	7,210.00	6,300.00
31 Water main, sta. 39+24	lump sum	1,237.37	650.00	700.00
32 Gas main, sta. 39+57	lump sum	227.47	377.00	400.00
33 Water suction line, sta. 40+88	lump sum	1,311.36	1,023.00	1,900.00
34 Water discharge line, sta. 41+48	lump sum	1,373.42	1,998.00	2,000.00
35 V. C. perforated pipe	700 lf	2.96	3.70	6.15
36 C. M. perforated pipe	3,600 lf	3.63	3.22	5.96
37 Sump pit	3 ea	123.20	193.00	260.00

Sewage Disposal Plant, El Reno, Okla.

OWNER: City of El Reno, Okla.; Rex Collins, McAlester, Okla., engineer.

PROJECT: Construction of sewage disposal plant and outfall sewer in El Reno, Okla. Project is divided into three parts: Section I, construction of disposal plant (capacity 4 million gallons per day), including 1,391 cu. yds. of excavation, installation of 451 lin. ft. of vitrified clay sewer pipe, from 6" to 18", 1,102 lin. ft. of cast iron pipe, from 12" to 18", and 842 lin. ft. of wire fencing; construction of access road and control house, and installation of necessary equipment; Section II, construction of east outfall and lift station, including installation of 12,988.5 lin. ft. of vitrified clay sewer pipe, from 10" to 18"; and Section III, construction of sewer extensions, including installation of 8.225.5 lin. ft. of vitrified clay sewer pipe, from 6" to 15", 180 lin. ft. of 14" cast iron pipe, and 22 sewer manholes, 6' deep and under.

CONDITIONS: All materials to be furnished by contractor. Access to job site is available by rail and highway. Contract time is 200 working days. Stipulated labor wage rates per hr. are: skilled labor, $1.25; semi-skilled, $1.00; and common, $1.00.

LIST OF BIDDERS: (*Contract awarded March 5, 1948.)

1.*M. A. Swatek & Co., Okla. City, Okla	$236.727.94
2. Lippert Bros. Co., Okla. City, Okla	271.646.72

		Unit Prices	
Item	Quantity	(1)	(2)
Section I:			
1 Vitrified clay sewer pipe, 6", in trench	285 lf	$1.90	$2.00
2 Vitrified clay sewer pipe, 12", in trench	146 lf	3.05	4.30
3 Vitrified clay sewer pipe, 18", in trench	20 lf	5.75	7.20
4 Sewer manholes 6' deep and under	6 ea	112.00	165.00
5 Additional depth masonry in manholes	7 vf	12.60	22.00
6 Excavation and embankment	1,391 cy	.85	4.60
7 Reinforced concrete	689 cy	39.25	44.00
8 Reinforcing steel	77,994 lb	.1025	.115
9 Cast iron pipe—6"	550 lf	4.80	5.00
10 Cast iron gate valves—6"	14 ea	54.00	65.00
11 Cast iron pipe, 18", remove and relay	230 lf	3.00	3.90
12 Cast iron pipe—12"	44 lf	7.25	8.00
13 Cast iron pipe—14"	268 lf	12.15	11.00
14 Cast iron pipe—18"	10 lf	14.00	18.00
15 Galvanized iron pipe ¾"	315 lf	1.00	1.50
16 Vitrified clay drain underdrain pipe—6"	1,301 lf	.37	.60
17 Sludge bed cover material	962 cy	4.30	4.50
18 Traffic bound surface course	538 cy	4.40	5.50
19 Sodding	8,100 sy	.08	.40
20 Wire fencing	280 lf	.55	1.50
21 Wire fencing, move and reset	562 lf	.20	1.25
22 Control house	lump sum	13,368.00	11,822.00
23 Flow indicating, recording, and integrating mechanism	lump sum	868.00	1,089.00
24 Revisions to existing pump house	lump sum	4,050.00	5,800.00
25 Recirculation measuring instrument	lump sum	785.00	525.00
26 Bar screen mechanism	lump sum	2,740.00	2,956.00
27 Primary clarifier mechanism	lump sum	10,720.00	12,240.00
28 Primary sewage pumps	lump sum	3,636.00	3,699.00
29 Resetting secondary pumps and float control	lump sum	1,435.00	1,727.00
30 Sewage distributor for roughing filter	lump sum	3,421.00	5,151.00
31 Secondary clarifier mechanism	lump sum	5,562.00	6,230.00
32 Digester cover, digester mechanism and heating system	lump sum	21,670.00	22,528.00
33 Sludge pump	lump sum	1,487.50	1,113.00
34 Moveable sludge belt conveyor	lump sum	5,185.00	4,600.00
35 Filter media	573 cy	7.55	6.60
36 Filter block underdrain tile	350 sf	1.00	1.00
37 Mine rail—30 lb	614 lf	1.50	1.80
38 Electrical	lump sum	11,450.00	17,995.00
39 Laboratory equipment	lump sum	2,090.00	2,433.00
40 Removal of existing structures	lump sum	780.00	1,250.00
Section II:			
41 Vitrified clay sewer pipe, 10", in trench 6' deep and under	2,045 lf	1.80	2.375
42 Vitrified clay sewer pipe, 10", in trench 6' to 8' deep	1,184 lf	1.95	2.70
43 Vitrified clay sewer pipe, 10", in trench 8' to 10' deep	662 lf	2.15	3.15
44 Vitrified clay sewer pipe, 10", in trench 10' to 12' deep	203 lf	2.30	3.50
45 Vitrified clay sewer pipe, 10", in trench 12' to 14' deep	211 lf	2.50	4.05
46 Vitrified clay sewer pipe, 10", in trench 14' to 16' deep	49 lf	2.70	4.60
47 Vitrified clay sewer pipe, 15", in trench 6' deep and under	200 lf	2.70	3.56
48 Vitrified clay sewer pipe, 15", in trench 6' to 8' deep	2,198 lf	2.80	3.50
49 Vitrified clay sewer pipe, 15", in trench 8' to 10'			

Continued on page 104

Sewage Disposal Plant, El Reno, Oklahoma

Continued from page 103

deep	3022.5 lf	3.10	3.80
50 Vitrified clay sewer pipe, 15", in trench 10' to 12' deep	1,594 lf	3.35	4.68
51 Vitrified clay sewer pipe, 15", in trench 12' to 14' deep	270 lf	3.50	5.23
52 Vitrified clay sewer pipe, 18", in trench 6' deep and under	350 lf	3.70	3.80
53 Vitrified clay sewer pipe, 18", in trench 6' to 8' deep	1,000 lf	3.90	4.00
54 Sewer manholes 6' deep and under	37 ea	121.50	130.00
55 Additional depth masonry in manholes	84.40 vf	13.25	20.00
56 Excavation and embankment	400 cy	1.50	1.00
57 Cast iron pipe—8"	137.50 lf	6.00	3.75
58 Cast iron pipe—10"	220 lf	6.00	4.70
59 Cast iron pipe—14"	100 lf	11.00	7.32
60 Sewage lift station	lump sum	21,612.50	17,400.00
Section III:			
61 Vitrified clay sewer pipe, 6", in trench 6' deep and under	629 lf	1.40	[illegible]
62 Vitrified clay sewer pipe, 6", in trench 6' to 8' deep.	205 lf	1.50	[illegible]
63 Vitrified clay sewer pipe, 6", in trench 8' to 10' deep	1,045 lf	1.60	[illegible]
64 Vitrified clay sewer pipe 8", in trench 6' deep and under	2,541.5 lf	1.60	1.50
65 Vitrified clay sewer pipe, 8", in trench 6' to 8' deep.	150 lf	1.70	[illegible]
66 Vitrified clay sewer pipe, 8", in trench 8' to 10' deep	770 lf	2.10	3.15
67 Vitrified clay sewer pipe, 10", in trench 6' deep and under	1,440 lf	1.65	2.38
68 Vitrified clay sewer pipe, 15", in trench 6' deep and under	1,445 lf	2.70	3.56
69 Sewer manholes 6' deep and under	22 ea	121.50	130.00
70 Flush tank manholes	2 ea	225.00	195.00
71 Additional depth masonry in manholes	12.90 vf	13.25	20.00
72 Sewer cleanouts complete in place	5 ea	20.00	35.00
73 Reinforced concrete	3 cy	45.00	40.00
74 Reinforcing steel	180 lb.	.10	.15
75 Cast iron pipe—14"	180 lf	11.00	7.32

Mitchell Field Airport Improvements, Wis.

OWNER: City of Milwaukee, Wis.; Thomas Cosgrove, engineer.

PROJECT: Clearing, grubbing, grading, draining, paving and seeding at General Mitchell Field Airport, Milwaukee. Work includes installation of 16,840 lin. ft. of perforated pipe underdrains, ranging from 8" to 21" in diameter, and 7,430 lin. ft. of storm sewer pipe arch.

CONDITIONS: All materials to be furnished by contractor. Access to job site is available by rail and highway. Work to begin within 60 days of date of notice to proceed. Project to be completed by November 1, 1948. Stipulated labor wage rates per hr. are: skilled labor, $2.15; semi-skilled, $1.75; and common, $1.40.

LIST OF BIDDERS: (*Contract awarded March 30, 1948,)

1.*Joseph D. Bonness, Inc., Milwaukee, Wis.	$867,191.35
2. Federal Paving Corp. & E. & C. Co., Milwaukee, Wis.	905,349.40
3. Milwaukee General Const. Co., Milwaukee, Wis.	918,502.70

COMPARISON OF 1946, 1947 AND 1948 BIDS ON AIRPORT CONSTRUCTION PROJECTS

		Unit Prices Bid for General Mitchell Field Airport					Unit Prices Bid for Similar Projects in 1946, 1947			
Item	Quantity	Engineer's Estimate	(1)	(2)	(3)	Average Bid Prices	Low Bid 1947 Const.	Average Bid—1947	Low Bid 1946 Const.	Average Bid—1946
1. Clearing and grubbing	10 ac	$500.00	$400.00	$400.00	$350.00	$383.33	$445.00	$408.33	......	......
2. Scattered trees	125 ea	15.00	12.00	10.00	15.00	12.33	6.75	14.69	......	......
3. Brush	1 ac	100.00	100.00	75.00	120.00	98.33	60.00	208.33	......	......
4. Grading	125,000 cy	0.45	0.45	0.43	0.52	0.467	0.38	0.385	......	......
5. Underdrains										
(a) Perf. pipe—8" dia	12,020 lf	2.26	2.30	2.40	2.80	2.50	1.67	2.585	2.284	......
(b) Perf. pipe—10" dia	685 lf	2.66	2.65	2.70	3.00	2.78	......	......	2.90	3.643
(c) Perf. pipe—12" dia	1,615 lf	3.10	3.25	3.25	3.50	3.33	2.35	3.224	2.739	......
(d) Perf. pipe—15" da	2,060 lf	4.73	4.25	4.75	5.00	4.67	3.80	4.658	3.30	4.135
(e) Perf. pipe—21" dia	460 lf	5.50	5.70	5.50	6.00	5.73	......	......	......	......
6. Inspection holes	19 ea	75.00	75.00	100.00	90.00	88.33	70.00	67.785	......	......
7. Storm sewer										
(a) Pipe, 24" dia., 16 ga	520 lf	5.05	6.60	5.75	6.20	6.18	......	......	4.30	5.687
(b) Pipe arch, 29" x 18", 14 ga	300 lf	7.60	7.15	7.25	8.20	7.53	6.75	7.047	5.75	7.197
(c) Pipe arch, 43" x 27", 10 ga	580 lf	15.80	19.00	17.00	20.50	18.83	14.00	14.793	11.80	14.518
(d) Pipe arch, 43" x 27", 12 ga	4,300 lf	11.25	14.00	16.00	15.00	15.00	10.50	11.838	9.20	11.593
(e) Pipe arch, 65" x 40", 8 ga	460 lf	25.00	30.00	29.00	32.00	30.33	......	......	......	......
(f) Pipe arch, 65" x 40", 10 ga	400 lf	20.00	25.00	26.00	27.00	26.00	......	......	......	......
(g) Pipe arch, 65" x 40", 12 ga	1,390 lf	16.25	21.00	24.50	24.50	23.33	......	......	......	......
8. Granular backfill	1,640 cy	3.15	3.00	3.50	2.50	3.00	2.50	2.93	2.60	2.74
9. Inlet manholes, type C-1	5 ea	192.50	200.00	220.00	250.00	223.33	175.00	178.28	110.00	161.25
10. Inlet manholes, type C-3	18 ea	80.00	125.00	150.00	150.00	141.67	......	......	......	......
11. Inlet manholes, type "A," "D" & "E"	55 cy	69.00	80.00	90.00	90.00	86.67	60.00	73.07	45.00	47.489
12. Reinforcing steel	15,400 lb	0.125	0.12	0.12	0.10	0.113	0.10	0.114	0.10	0.095
13. Cast iron grates and frames	18 ea	60.50	85.00	75.00	75.00	78.33	60.00	55.285	50.00	52.625
14. Concrete headwall	4 cy	69.00	100.00	90.00	90.00	93.33	80.00	108.285	45.00	55.791
15. Reinforcing steel	200 lb	0.125	0.12	0.12	0.10	0.113	0.10	0.114	0.10	0.095
16. Grouted riprap	15 sy	11.00	15.00	20.00	12.00	15.67	10.00	10.14	10.00	7.667
17. Underground cable ducts—three-duct bank	2,900 lf	2.90	2.50	3.50	3.60	3.20	2.25	2.965	......	......
18. Underground cable ducts—five-duct bank	186 lf	3.50	3.50	4.50	5.00	4.33	......	......	......	......
19. Granular base course (12")	92,210 sy	0.80	0.75	0.82	0.74	0.77	0.70	0.836	......	......
20. Granular base course (10")	2,625 sy	0.80	0.75	0.82	0.74	0.77	......	......	......	......
21. Granular base course (8")	29,825 sy	0.70	0.70	0.72	0.69	0.703	0.70	0.738	......	......
22. Traffic bound wearing course (3")	29,825 sy	0.48	0.45	0.55	0.55	0.517	0.45	0.447	......	......
23. Concrete pavement for runway & taxiway—12"	84,090 sy	4.25	4.17	4.26	4.25	4.227	3.54	3.87	......	......
24. Concrete pavement apron (8")	2,475 sy	4.00	3.85	4.26	4.20	4.103	......	......	3.10	3.607
25. Crushed aggregate base course	1,150 cy	4.50	3.50	3.00	3.50	3.33	0.87	0.883	......	......
26. Prime coat RT-3	9,200 gal	0.193	0.22	0.22	0.22	0.22	0.15	0.168	......	......
27. Paving east & west parking areas										
(a) 2½" Tar concr. pavement binder course	5,900 ton	11.74	10.75	11.25	12.00	11.33	10.00	10.214	......	......
(b) ¾" Tar concr. pavement top course	1,380 ton	12.73	11.75	12.25	12.25	12.08	11.00	11.071	......	......
28. Seal coat RT-8	6,890 gal	0.193	0.22	0.22	0.22	0.22	......	......	......	......
29. Limestone screenings	345 ton	1.40	5.50	3.00	3.00	3.83	......	......	......	......
30. Road tar mix for hangar area	30,740 sy	1.25	1.25	1.25	1.30	1.267	......	......	......	......
31. Bumper guard rail	1,900 lf	1.00	3.00	2.70	2.80	2.83	......	......	......	......
32. Fertilizer	14 ton	90.00	80.00	80.00	85.00	81.67	80.00	83.57	......	......
33. Seeding 60# per acre	25 ac	75.00	60.00	72.00	70.00	67.33	60.00	75.00	......	......
34. Seeding 30# per acre	65 ac	45.00	30.00	37.00	36.00	34.33	30.00	47.143	......	......
35. Seeding winter rye cover crop	30 ac	15.00	15.00	18.00	20.00	17.67	10.00	20.857	......	......

New Aids to the Constructor

MANUFACTURERS' LATEST DEVELOPMENTS IN EQUIPMENT AND MATERIALS

DITCH DIGGER—Production has been started on a ditch-digging machine designed primarily for digging trenches for small building foundations, shallow pipe lines and for drainage. The trencher derives its power from either a Ferguson tractor or jeep and in recent tests dug 166 ft. of trench 16 in. wide and 18 in. deep in an hour and a half. Ten turns were made and the time included setting up and tearing down the machine. The machine has been tested in all types of soil with uniform success. Present units dig to 30 in. in depth and are adjustable from 12 to 18 in. wide. Earth from the endless chain of 14 scoops is dumped well back from the trench by a worm conveyor.—*W. W. Everett, 311 E. Broadway, Phoenix, Ariz.*

OUTSIZE STONE CRUSHER—An experimental model of a super-size double impeller impact breaker has been constructed. The manufacturer expects that the machine will handle any stone fitting into a 2-yd. shovel. It is designed to produce aggregate in minus 8 in. and minus 3½ in. Two impellers which strike the stone in midair as it falls into the breaking chamber will each weigh 13,400 lb., with bars. Each impeller will have three pairs of 500-lb. bars. Rotating in opposite directions, the impellers will be capable of a maximum speed of 785 rpm. It is estimated that each impeller will require a separate power unit of from 100 or more hp.—*Downs Crane and Hoist, New Holland, Pa.*

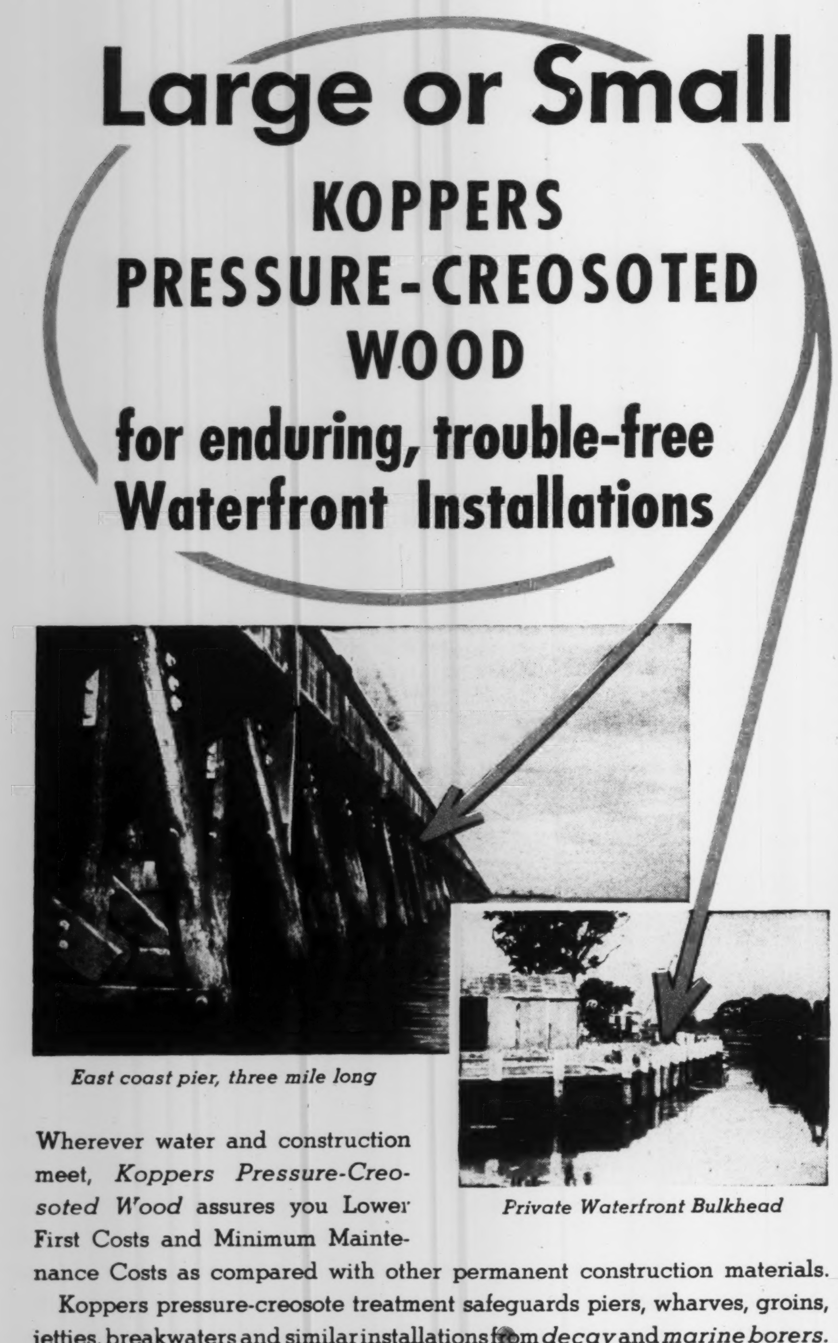
ALL-WHEEL DRIVE CONVERSIONS—Designed for new 1948 Ford models to increase tractive power of vehicle in deep mud, sand or snow, or on steep hills. Original front-axle assembly is removed and new front-driving axle is installed. Necessary changes also are made in steering assembly and hydraulic brake connections. All-wheel drive is designed and engineered specifically for Ford vehicles; it is not an attachment, but is actually built into each vehicle becoming an integral and permanent part.—*Marmon-Harrington Co. Inc., Indianapolis 7, Ind.*

ABRASIVE SAFETY TREAD—The material called AMCOLUN is composed of abrasive material including aluminum oxide and other inert fillers bonded together with a heat-resisting thermo-setting phenolic resin. Durable safety tread has non-slip surface effective under wet, dry or oily conditions. Weighs 2½ lb. per sq.ft. Shows less than 1 percent absorption after 24-hr. immersion. Available with nosing for steps and also produced in sheets and in 6 in. sq. tiles for floor coverings. Colors: red, green and black.—*American Abrasive Metals Co., Irvington, 11, N. J.*

COLD PAINT STRIPPER is said to remove paints, lacquers, enamels, synthetics, varnishes and wrinkles almost instantly and to require no neutralizing action other than a pressure water flushing or wiping well with a rag. Requires no heat and is non-inflammable. Primarily intended for dipping, but may be applied either by brush or spray.—*Allied Finishing Specialties Co., 2639 W. Grand Ave., Chicago, Ill.*

SAW FILER—Tool for expert saw filing at home or on the job, is equipped with a guiding device that may be swung into five different positions so that the file will move either at right angles to the blade or at various other angles. Two positive adjustments set the correct pitch and angle for any type of handsaw and are maintained throughout the filing operation. Useful for filing cross-cut or rip saws and can also be clamped to a beam over work bench for accurately controlled filing—*Speed Corp., Portland, Ore.*

PICK-UP STREET SWEEPER—Operator's comfort, visibility and easy access to all controls are special features of the "Gutter-Snipe" street sweeper. The seat is mounted on a coil spring with hydraulic shock absorber, with spring cushion and back. Without bending, the operator has a direct view of the curb line. The gutter broom, pickup broom and dirt hopper have individual hydraulic controls. To insure proper maintenance this model is designed to permit access to all operating parts by raising a hinged panel on the left side of the sweeper, and the whole engine is exposed by raising a hinged engine hood. The sweeper thoroughly cleans a path on the street 6-ft. wide without streaking. — *Municipal Supply Co., South Bend 23, Ind.*



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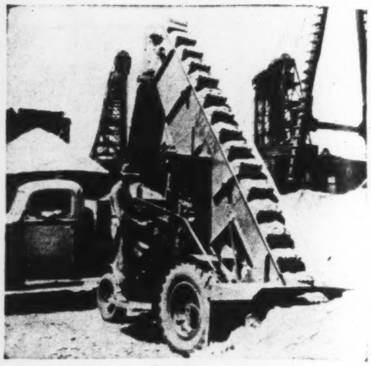

BUCKET LOADER—Heavy enough for pit and road work, yet quickly maneuverable in yards. Moves under own power and is equipped with a two-chain elevator and four-speed transmission. Separate Twin Disc clutches control traction and elevator, the latter having automatic overload release to prevent damage to machine. Feeder blades pick before they shovel, loosening the material and heaping it into buckets at speeds up to 2 cu.yd. per minute. Power unit is 27-hp. LeRoi gasoline engine. K-5 machine handles earth, gravel or broken stone up to 2½ in size.—*N. P. Nelson Iron Works, Inc., Clifton, N. J.*

CRUSHING AND SCREENING PLANT—Semi-portable duplex plant has jaw crusher and roll crusher together with folding bucket elevator and power unit, all mounted on structural steel chassis with steel wheels although pneumatic tires are optional. Additional units consist of three-deck 3x10-ft. vibrating screen mounted atop a 20-cu. yd. three-compartment steel storage bin and a return conveyor from screen to roll crusher. Plant is rated at normal capacity of 40 to 50 tons per hour of sizes of material.—*Pioneer Engineering Works, Inc., Minneapolis, Minn.*

NEW COATING COMPOUND—"Eternacote" is a newly-developed compound for coating concrete pipe. Still undergoing tests, this is a transparent liquid organic chemical compound with a pure rubber base. It is said to be a low-cost, permanent, glass-like coating for the protection of concrete pipe against sulphuric and other sewage acids.—*George W. Hoffman Corp., 121 Broad Street, New York, N. Y.*

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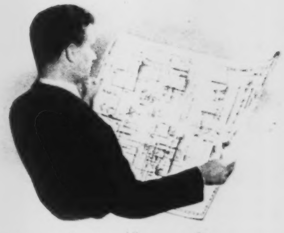

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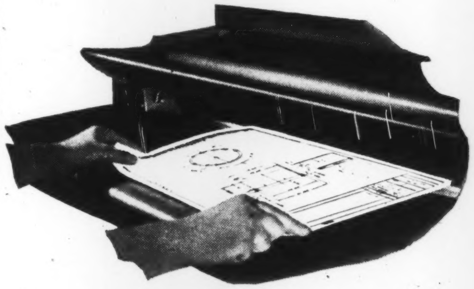

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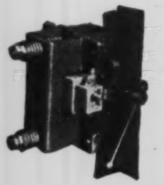

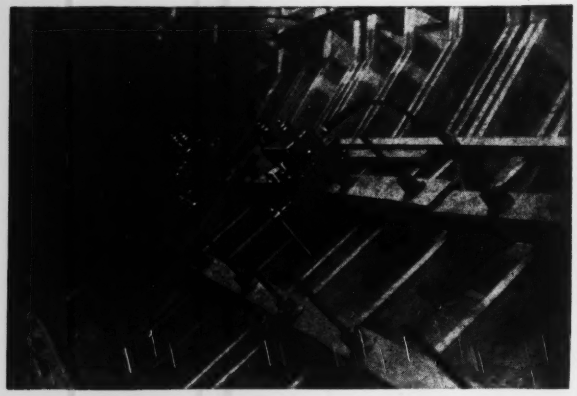

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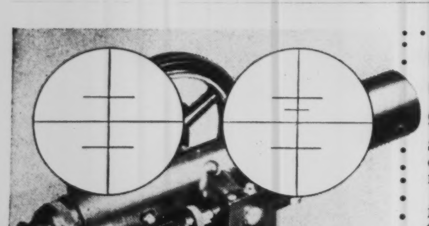

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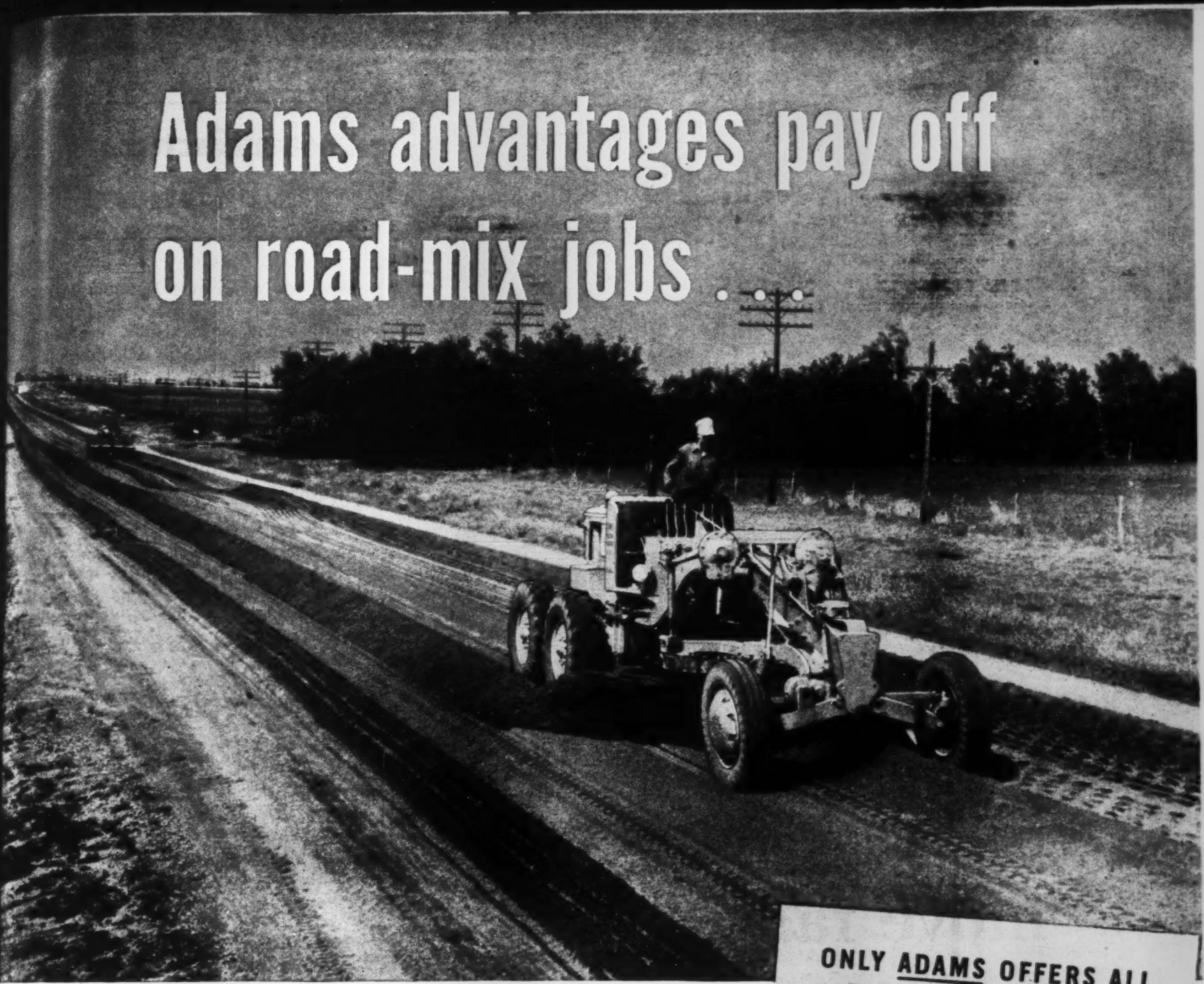
HEAVY-DUTY MOTOR GRADER—The manufacturer has just released information on a new extra heavy-duty motor grader. A few of the outstanding features listed in specifications are 100 hp. diesel engine; weight range of 23,285 to 25,050 lb., depending upon extra equipment; complete hydraulic control; manual steering with hydraulic booster; all-gear tandem drive, 14.00 x 24 low pressure tires, both front and rear; eight forward speeds giving a range of 1.5 to 26.0 miles per hour. Model 116 is said to be designed and constructed to handle the heaviest and toughsest kind of work. Precision controls permit grading to exacting specifications.—*The Galion Iron Works & Mfg. Co., Galion, Ohio.*

SEWER DESIGN SLIDE RULE—For the solution of sewer design problems this sewer design slide rule is of real value. It has a wide range, is of handy size, and simple and quick to operate. The device is based on the Chezy formula and applies to circular sewers only.—*Irving Goldfein, 3052 N. 49th St., Milwaukee 10, Wis.*

FOR UNDERWATER SURVEY—A portable precision supersonic depth recorder is useful for channel dredging, survey and salvage operation. It measures automatically and accurately the depth of water beneath a vessel, recording depths in continuous profile as the vessel proceeds over its course. It also reveals the nature of sea bottom materials.—*Bludworth Marine, 92 Gold St., New York 7, N. Y.*

PAVERS—Two new pavers feature "Hydrocycle control", which combines timing of batch with timing of complete paving cycle. It automatically starts discharge, starts skip, turns water on and off, closes discharge chute, and operates transfer on double drum design. Among other features are improved visibility from operator's seat, extra wide unobstructed skip with truck stops, and greater stability due to extended crawlers on rear. Streamlined shielding houses entire body.—*Chain Belt Co.,* 1600 *W. Bruce St., Milwaukee* 4, *Wis.*

FOR DISCHARING BITUMINOUS MIX — Special tower attachment is adaptable to either the 10 or 14 cu. ft. Kwik-Mix bituminous mixer. Loads bituminous material from ground level mixer into trucks or for stockpiling. Discharge height is from 7¾ to 8¾ ft. Operated by hoist powered by mixer motor. Loader is fully controlled by single lever on operator's platform.—*Koehring Co.,* 3026 *W. Concordia Ave., Milwaukee* 10, *Wis.*



ONLY ADAMS OFFERS ALL THESE OUTSTANDING ADVANTAGES

- 8 Overlapping Forward Speeds
- High-Arch Front Axle for Clearance
- Push-Button Starting from Cab
- Positive Mechanical Controls
- Wide Range of Blade Adjustments
- Exceptional Blade Clearance in All Operating Positions
- Balanced Weight Distribution
- Easy Access for Fast Servicing
- World-Wide Dealer Service

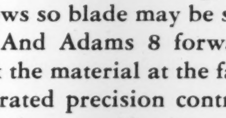
ROAD-MIX WORK—to be fast, efficient, economical—calls for motor graders with the combination of operating advantages found only in Adams Motor Graders.

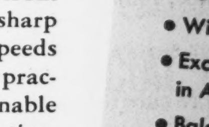
In the picture above you see these Adams advantages at work on a typical road-mix job. On work of this kind Adams high-arch front axle permits straddling of big windrows so blade may be set at sharp angle for maximum mixing action. And Adams 8 forward speeds provide exactly the right speed to mix the material at the fastest practical rate. Finally, Adams power-operated precision controls enable the operator to lay out material accurately to specifications—*every time.*

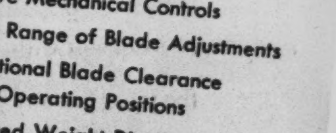
Just as Adams Motor Graders excel on road-mix work, so are they tops for all grader operations. Let your local dealer explain how Adams Motor Graders are *Your Best Buy—All Ways.*

J. D. ADAMS MANUFACTURING CO. • INDIANAPOLIS, INDIANA

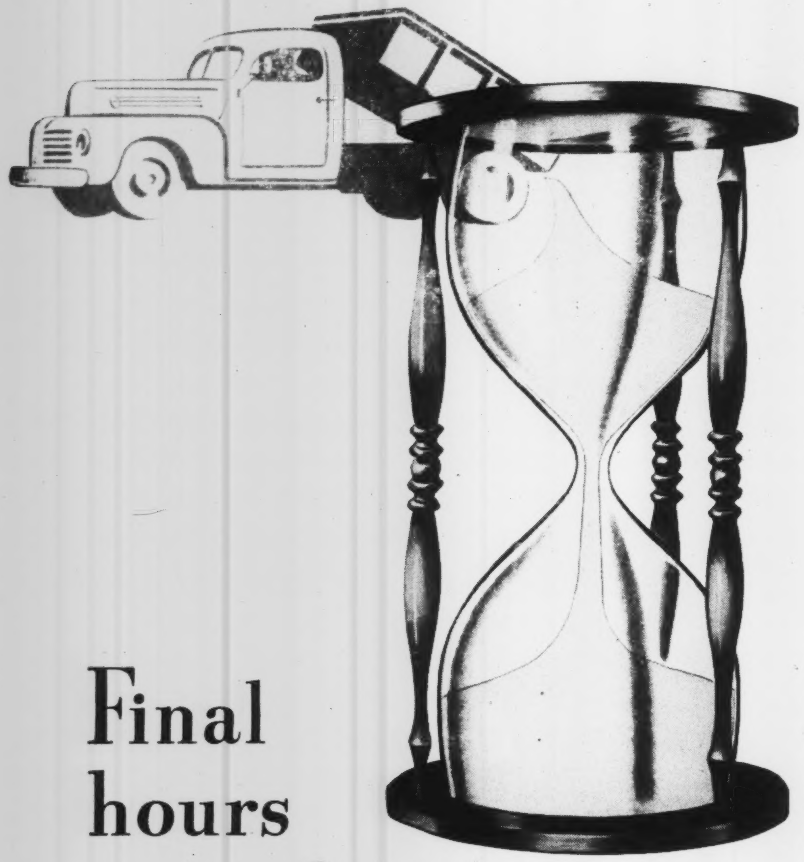
Adams







MOTOR GRADERS • LEANING WHEEL GRADERS • ELEVATING GRADERS



Final hours move fastest

It's a familiar story to the contractor: you're preparing to go after a job . . . everything has to be done at once . . . *just see how the time slips by!*

You know how *you* need time. If you're going to get bid and performance bonds, remember: *your surety needs time, too.* Consult with your surety *early* in your preparation for the job. That way you're sure to get the best possible service.

IT'S NEVER TOO EARLY
TO CONSULT WITH YOUR SURETY

Agents from coast to coast

Ætna Casualty and Surety Company

Affiliated with Ætna Life Insurance Company
Automobile Insurance Company • Standard Fire Insurance Company
HARTFORD 15, CONNECTICUT

Manufacturers' Publications

Anchors as Joint Hangers—(6-p. leaflet) describes Trip-L-Grip framing anchors in place of old style joist hangers to eliminate notching and shimming uneven joists. Use of anchors eliminates cost of ledger strips, cost of notching, and is claimed to be better than direct bearing.—*Timber Engineering Co., 1319 18th St., NW, Washington 6, D. C.*

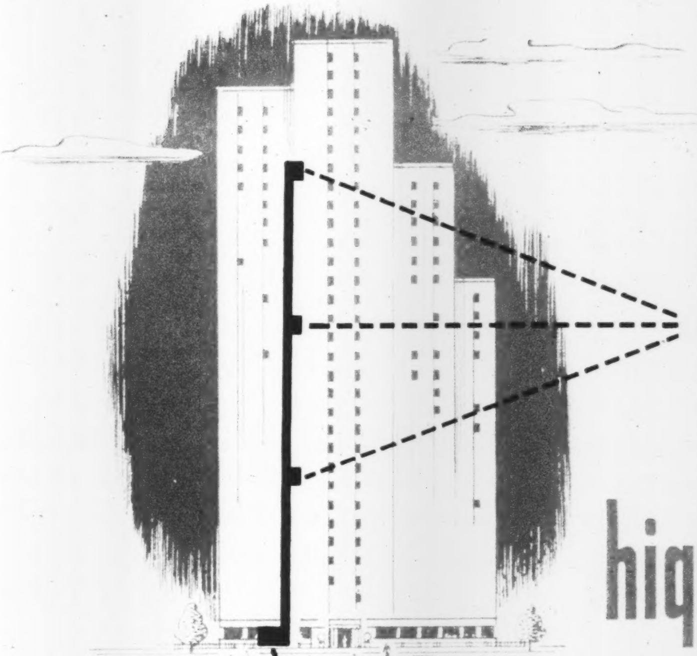
Carrying Scrapers—(16-p. pamphlet) devoted exclusively to problems of earth moving with Caterpillar scrapers. Describes and illustrates loading, hauling and spreading jobs with tractor-drawn scrapers.—*Caterpillar Tractor Co., Peoria 8, Ill.*

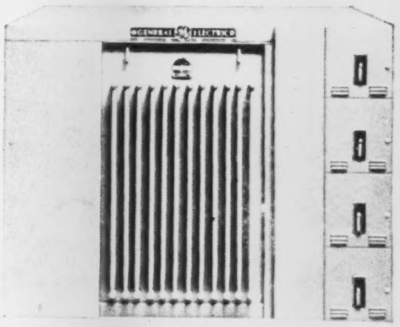
Paint Air Gun—(1-p. leaflet) Equipped with four sizes of interchangeable air and fluid tips. Uses air pressure from 10 to 60 psi. Gives advice on operation and on care and cleaning. Similar leaflet also available on the company's abrasive gun for production stencil purposes and the automatic air brush.—*Paasche Air Brush Co., 1909 Diversey Parkway, Chicago 14, Ill.*

Manganese Steel Chains—A 28-page booklet tells of austenitic manganese steel and its characteristics, and shows the advantages of manganese steel chain for tough jobs involving shock and abrasion such as for elevators, conveyors, dredging and dragline.—*American Manganese Steel Division of American Brake Shoe Co., Chicago Heights, Ill.*

Wall and Ceiling Panels—(8-p. pamphlet) Lightweight material of Swiss origin is made of wood chips chemically treated and mixed with portland cement. Named Durisol, the material is subsequently shaped under pressure and dried into panels, slabs and blocks of standard sizes. May be cut, sawn or nailed. Applications include: insulating slabs, concrete slab filler panels, intermediate floor slabs, exterior wall panels and ceiling slabs.—*Durisol, Inc., 420 Lexington Ave., New York 17, N. Y.*

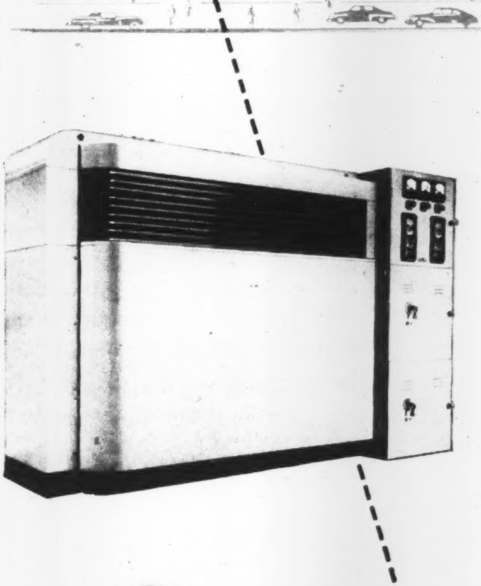
Gratings—A new catalog, illustrating and explaining uses of all types of riveted and welded open steel and aluminum flooring, grating, stair treads, catwalks and structural steel walkways, has just been published.—*William F. Klemp Co., 6,608 S. Melvina Ave., Chicago 38, Ill.*





high-voltage runs

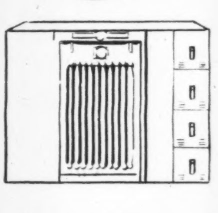
are low-cost runs



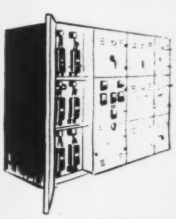
Load-center distribution keeps uneconomical low-voltage cable short, power loss low, voltage regulation high—In fact, here's a power-distribution idea that may bring you almost unbelievable savings in first cost, and at the same time make your system more flexible and expansible. Power is distributed at relatively high voltage to unit substations located *near the load centers.* There it is stepped down to utilization voltage and distributed to the loads via short feeders.

Keeping high-loss secondary feeders *short* means less loss in feeders, better regulation at the load. Having several distribution points in the system (instead of only one at the service entrance) isolates faults, increases service continuity. These are only a few of the advantages of load-center distribution; your nearest G-E sales office will have an application engineer tell you the rest and help you plan your entire distribution system. Call today, or write for **Bulletin GEA-3758, "Load-center Power Distribution."** *Apparatus Dept., General Electric Company, Schenectady, N. Y.*

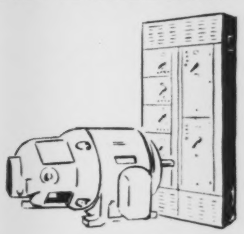
EQUIPMENT FOR COMMERCIAL BUILDING



Power-distribution Systems



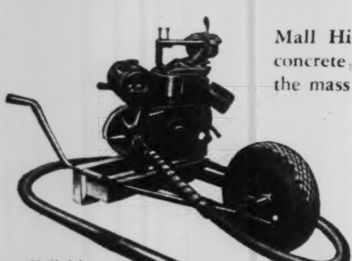
Rectifiers for Power Conversion



Motors and Control

GENERAL ELECTRIC

665-104



Vibrate
LARGER AREAS FASTER...
with Mall REG. U.S. PAT. OFF. **HI-KIK**
Concrete VIBRATORS

Mall Hi-Kik Concrete Vibrators place larger masses of concrete in less time . . . the vibration waves penetrate the mass to a greater distance, in all directions, from the vibrating element . . . and the concrete is packed tighter against the forms.

Mall Hi-Kik vibration gives concrete greater uniformity in strength and density. It bonds better with reinforcement, and assures a better water-tight job. Interchangeable attachments for wet wall rubbing, form sanding, pumping, wire brushing, drilling, grinding and sharpening tools make this rugged unit easy to keep busy.

Mall 3.h.p.
Hi-Kik Vibrator
Variable Speeds to
7000 frequencies

Write for FREE folder Mall concrete Vibrators and name of nearest dealer.

MALL TOOL COMPANY, 7730 South Chicago Ave., Chicago 19, Ill.

PROTECT AND SAVE CONCRETE FORMS...

coat them with **PLASTIGLAZE**

Plastiglaze is a clear, fast air-dry liquid plastic of the polyester resin family. It can be brushed, sprayed, or dipped. Plastiglaze penetrates and seals plywood or common lumber. It forms a hard high gloss finish, resistant to water, alkalis and mild acids.

Plastiglaze coated forms may be used over and over again without deterioration. Plastiglaze has been used successfully for coating wood forms in bridge, home, and other concrete construction.
For more information, write:

CALRESIN CORPORATION
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PLASTITOOL • PLASTIFLEX • PLASTIFORM • PLASTIGLAZE

Organization Handbook—The U. S. Department of the Interior has issued an official organization handbook for use in 1948. The publication contains organization charts and names of administrative officers for all divisions, bureaus and offices of the department, together with information on district, project and field offices. Functions of the administrative personnel and of the various branches in each unit are briefly described.—*U. S. Department of the Interior, Washington, D. C.*

Abrasion Resisting Steel Plates—(2-p. bulletin). Describes tough and comparatively low-priced steel to resist abrasion and wear. Typical applications are listed including chutes, mixer liners and blades, buckets for conveyors, road scraper blades, clamshell bucket lips and dragline equipment. Additional information includes heat-treatment and fabrication, and illustrations of uses in different fields.—*Jos. T. Ryerson & Son, Inc., P.O. Box 8000-A, Chicago 80, Ill.*

Bulldozers and Snowplows—(22-p. catalog and price list). Dozers are built to fit without alteration, non-current models of Caterpillar tractors. Straight blade dozers feature double beveled reversible cutting edges. Snowplows include V-type and reversible blades and one-way plows for motor graders and trucks.—*Balderson Mfg. Co., Wanego, Kan.*

Fire Retardant Wood—(12-p. booklet). Discusses ratings of various building materials, methods of treating wood to make it fire retardant, lists applications in which fire retardant wood is of special value and tests of fire retardant wood.—*Koppers Co., Inc., Wood Preserving Division, Koppers Building, Pittsburgh 19, Pa.*

Concrete Construction Accessories—(52-p. booklet). Covers wall form ties and clamps for ordinary foundations, for engineering structures and for watertight walls and architectural concrete. Other subjects treated are form hangers, beam clamps and saddles, coil tie hangers, wire beam saddles and various other accessories for reinforcing steel in structures and in highways, the latter including dowel bar supports and individual dowel chairs.—*Superior Concrete Accessories, Inc., 4110 Wrightwood Ave., Chicago 39, Ill.*

Scarifier and Pulverizer—(Leaflet). Extra heavy-duty tractor-hauled unit built in two sizes to cut 6 and 4-ft widths. Designed to tear up old oil mats and macadam roads and prepare them for re-use.—*Wood Mfg. Co., 6900 Tujunga Ave., North Hollywood, Calif.*

FOR THE *Biggest* JOBS . . .

LOCK JOINT SERVES BEST!

Installing 140 inch Lock Joint Reinforced Concrete Cylinder Pipe for the Metropolitan Water District of Southern California.

Delivery of 138 inch Lock Joint Reinforced Concrete Cylinder Pipe for Boston Aqueduct.

A long record of successful contracts for the manufacture and installation of reinforced concrete pressure pipe in sizes from 16 inches to 150 inches has established Lock Joint Pipe Company as a leader in the field of water supply.

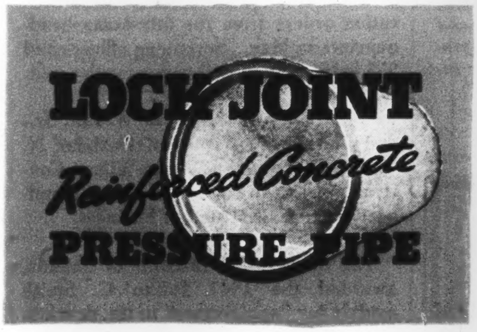
Significantly, Lock Joint Reinforced Concrete Pressure pipe is the first choice of larger municipalities engaged on water supply projects of unusual magnitude.

These are but a few of the major water supply installations built by Lock Joint throughout the past 40 years:

THE CITY OF BOSTON *selected Lock Joint Reinforced Concrete Cylinder Pipe for its 83,000 foot aqueduct. The diameter of the pipe for this huge project ranged from 84 inches to 150 inches.*

THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA *chose Lock Joint for 114,000 feet of its water supply system. Lock Joint Reinforced Concrete Cylinder and Bar Cage Pipe ranging from 116 to 144 inches in diameter was used on this project.*

THE CITY OF CLEVELAND *is now engaged in the largest subaqueous pipe installation in history. The Nottingham intake will consist of 120 inch subaqueous pipe running 18,470 feet out into Lake Erie. For this project the City's engineers selected Lock Joint Subaqueous Pipe.*



LOCK JOINT PIPE COMPANY
Est. 1905
P.O. Box 269, East Orange, N. J.
PRESSURE PIPE PLANTS: Wharton, N. J. • Turner, Kan.

BRANCH OFFICES: Cheyenne, Wyo. • Denver, Colo. • Kansas City, Mo. • Joplin, Mo. • Valley Park, Mo. • Chicago, Ill. • Rock Island, Ill. • Wichita, Kan. • Kenilworth, N. J. • Hartford, Conn.

SCOPE OF SERVICES—Lock Joint Pipe Company specializes in the manufacture and installation of Reinforced Concrete Pressure Pipe for Water Supply and Distribution Mains in a wide range of diameters as well as Concrete Pipe of all types for Sanitary Sewers, Storm Drains, Culverts and Subaqueous Lines.

–it's from HERE

to HERE

● It's an easy matter to define the "comfort zone" in a plant. It's that eight or ten feet above the floor that must be heated for employee comfort. But it's quite another matter to heat it economically and effectively when thirty feet of air space extend above it to the roof.

Such a problem faced the Minweld Steel Company in its new fabricating plant in Pittsburgh—and a Dravo *Counterflo* Heater solved it for them.

This powerful unit discharges warm air above the heads of the workers, circulates it through the working area, and returns it without drafts to the base of the heater for reheating and recirculating. This method maintains uniform heat throughout the 6,500 square foot working area—even though two 19-foot square truck doors open at each end, and metal-siding walls are broken by an abundance of windows.

Installation of the self-contained Dravo *Counterflo* Heater required only a fuel line, a power line and a small venting stack—no boiler room or piping. Ductwork, too, is unnecessary because capacity is ample to blanket a radius of 250 feet completely and *evenly* with warm air. The unit is entirely automatic . . . it is shut off at night—and at 6 A.M. the watchman simply flips a switch and the plant is warm fifteen minutes later.

Bulletin IV-516 contains valuable information about the Dravo *Counterflo* Heater which you can apply to your own heating problems. Write for it, Heating Section, Dravo Corporation, Dravo Building, Pittsburgh 22, Pa.

In a fabricating plant such as Minweld Steel Company, man-hours and efficiency are vitally important. "In a recent two week period," Owner William Minnotte says, "we estimated a saving of twenty man-hours because our men didn't have to stop work and try to get warm around old-fashioned coal stoves. Increased productivity, of course, is also tied to the increased comfort of our employees."

Dravo also manufactures the *DRAVO CRANE CAB COOLER* for air conditioning hot-metal crane cabs

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Sales Representatives in Principal Cities

Mfd. and sold in Canada by: Marine Industries, Ltd., Sorel, Quebec

DRAVO

Men and Jobs

Charles P. West has been named assistant engineer in the Broome County, N. Y., highway department, succeeding **Regis McNamara** who resigned to devote his time to the private practice of engineering. Mr. West at one time served in the Binghamton office of the U. S. Army Engineers and worked on the area flood control program.

Richard C. Ward and **James W. Moore** have established the firm of Ward and Moore, consulting engineers, as successors to Richard C. Ward, consulting engineer, with offices at 126-130 Pine St., Corning, N. Y.

Frank B. Durkee of Sacramento has been appointed acting deputy director of the California Public Works department. Durkee succeeds **A. H. Henderson** who was recently named director of the state department of motor vehicles.

George Douglas Mallory, graduate of Queen's University, has been appointed acting coordinator of the Public Projects Branch, Department of Reconstruction and Supply of Canada, created to prepare a shelf of reserve projects, upon which work can be commenced when necessary to maintain employment.

Don C. McMillan, a civil engineer and city manager of Alameda, Calif., will become city manager of Pasadena, Calif., July 15. He was graduated from Colorado College in 1923 as a civil engineer and was city engineer of Ventura, Calif., from 1927 until 1934, and city manager from then until 1943 when he became city manager of Alameda.

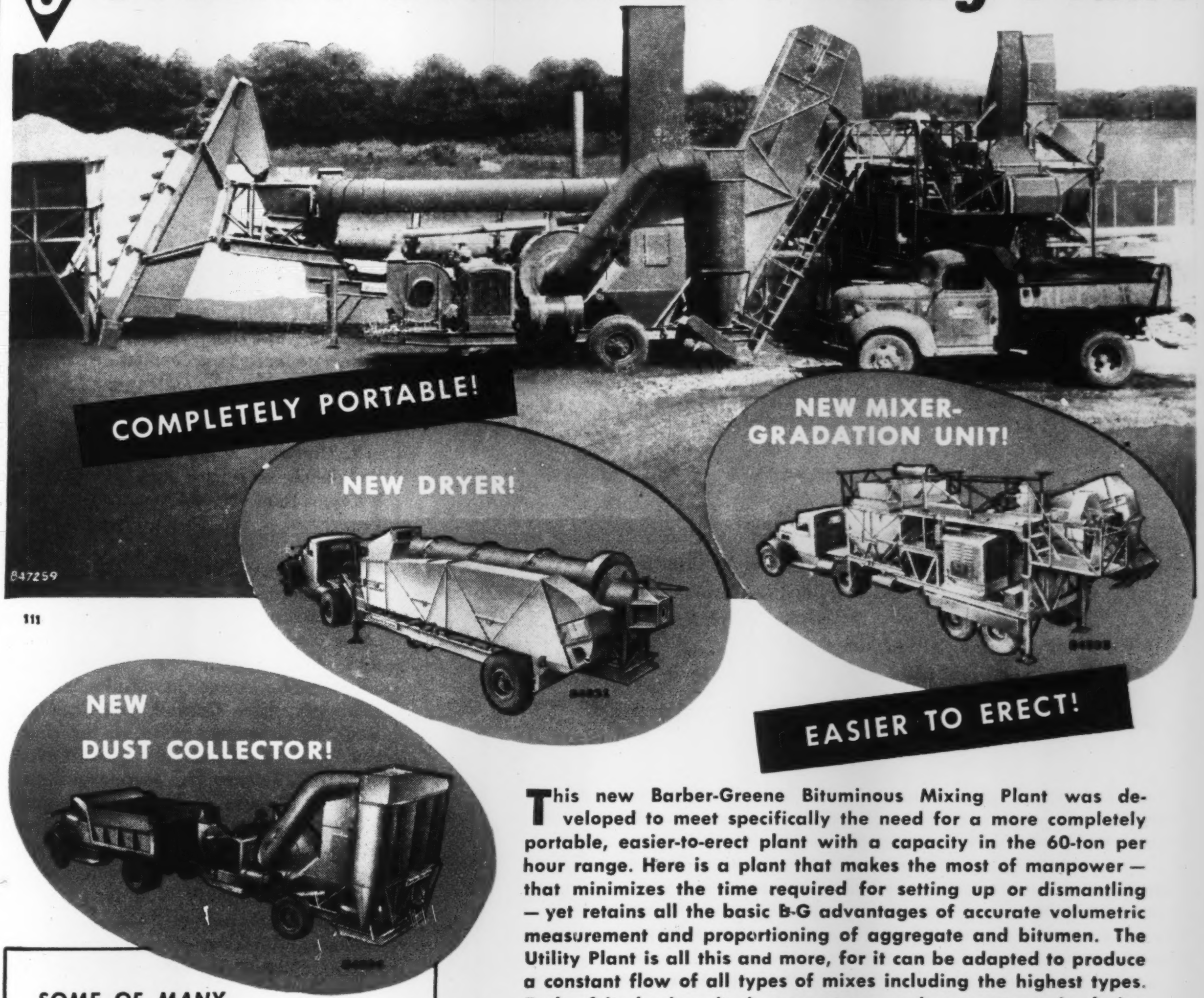
Lt. Col. Walter A. Kratt, chief engineer of the Commission of Public Docks, Portland, Ore., has been named commanding officer of the newly-activated headquarters and headquarters company, 497th Engineer Port Construction and Repair Group. The unit, sponsored by the Portland chapter of the Associated General Contractors, received activation orders from the 6th Army headquarters in May. Seventeen officers and 255 enlisted men will comprise the unit.

O. Z. Wrenn, Sr., O. Z. Wrenn, Jr., and **Charles T. Wilson** of Durham, N. C., have formed the Wrenn-Wilson Construction Co., to conduct a general engineering and construction business.

The Engineering Institute of Canada, awarded the 1947 Julian C. Smith medals for "achievement in the develop-

Barber-Greene

UTILITY Bituminous Mixing Plant



This new Barber-Greene Bituminous Mixing Plant was developed to meet specifically the need for a more completely portable, easier-to-erect plant with a capacity in the 60-ton per hour range. Here is a plant that makes the most of manpower — that minimizes the time required for setting up or dismantling — yet retains all the basic B-G advantages of accurate volumetric measurement and proportioning of aggregate and bitumen. The Utility Plant is all this and more, for it can be adapted to produce a constant flow of all types of mixes including the highest types. Each of its basic units incorporates new improvements in design to achieve the maximum in portability, simplicity in erection and operation.

Before bidding on any bituminous job, get full information on this new, advanced design Utility Plant. Use the coupon or see your Barber-Greene distributor for your copy of Bulletin 845.

SOME OF MANY REVOLUTIONARY FEATURES!

- ***True portability*** in every unit
  Faster erection without cranes or heavy equipment
- ***No cribbing*** necessary
- ***Adaptability*** to widest variety of jobs and mixes
- ***Built-in*** Gradation Control
- ***Built-in*** Elevators on Dryer and Mixer
- ***High Discharge Dryer***—eliminates hot elevator pit
- ***Two, three*** or ***four-bin*** aggregate gradation

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BARBER-GREENE COMPANY
AURORA, ILLINOIS

Send copy of Bulletin 845
Name ....
Firm Name ....
City ....**State**.............

Out on a limb because of shortages?

Call on Air Express. It's the best—and *fastest*—way to get supplies, parts and equipment. This super-speedy service is a round-the-clock proposition, speeding your shipment via Scheduled Airlines—offering you pick-up and delivery *at no extra cost*.

Air Express rates are surprisingly low. Use its speed *regularly* to clip whole days off shipping time, and keep your business running in high gear.

Specify Air Express-World's Fastest Shipping Service

- Low rates—special pick-up and delivery in principal U.S. towns and cities at no extra cost.
- Moves on all flights of all Scheduled Airlines.
- Air-rail between 22,000 off-airline offices.

True case history: Tulsa, Oklahoma, factory regularly gets machine replacement parts by Air Express. Keeps production moving. Typical shipment (25 lbs.) left Milwaukee at 10:10 A.M., delivered Tulsa 6:40 P.M. same day. 655 miles, Air Express charge $5.37. Any distance similarly inexpensive. Phone local Air Express Division, Railway Express Agency, for fast shipping action.

AIR EXPRESS
AIR EXPRESS
GETS THERE FIRST
Rates include pick-up and delivery door to door in all principal towns and cities

AIR EXPRESS, A SERVICE OF RAILWAY EXPRESS AGENCY AND THE

SCHEDULED AIRLINES OF THE U.S.

ment of Canada" to **P. L. Pratley**, consulting engineer, Montreal, and to **P. M. Saunders**, general manager of Western Irrigation Districts, Strathmore, Alta.

W. T. Eiffert formerly district engineer with the Washington State Health Department has resigned and is now engineer with the Ralph Woolpert Co., consulting engineers, Dayton, Ohio, on sanitary and water supply engineering.

R. L. Cullum is district manager and C. I. Knudson, contract engineer of the new Chicago office of Turner Construction Co., 105 West Adams Street.

Charles M. Upham, Jr., formerly traffic engineer for the Chamber of Commerce, has been appointed traffic engineer for Hartford, Conn. The new office was established by the city council May 24.

Edward Hamel, city engineer of Quebec, Que., has celebrated his 35th year of service. He is a graduate of Montreal Polytechnic School and of Laval University, 1908.

J. B. Neely is now with the Army Engineers as office engineer on the Whitney Dam and Reservoir, Whitney, Tex.

Ebasco Services, Inc., has announced the appointment of **Francis W. Crandall** as manager of its Washington, D. C., office, succeeding **William P. Reilly**, who resigned to become president of The Arizona Power Co. Following his graduation from Cornell, Mr. Crandall was for several years in various branches of engineering work. In 1939 he was made executive secretary of the National Defense Power Committee, and in 1942 he was commissioned a major in the U. S. Army and appointed as the Army's representative on power matters on the Army & Navy Munitions Board. He later was promoted to lieutenant colonel and was attached to the U. S. military mission to Moscow in 1944.

John S. Cotton recently returned after serving 3 years as chief engineer, National Hydroelectric Engineering Bureau, China, and has opened an office as consulting engineer at 28 Brookside Dr., San Anselmo, Calif. Prior to going to China, he was principal engineer, Federal Power Commission, San Francisco. He will specialize in power and river basin engineering.

William A. Sandberg and **Peter Serrell** have organized the Sandberg-Serrell Corp., consulting engineers, Pasadena, Calif., and will specialize in mechanical and structural design problems. Sandberg formerly was chief engineer of the Lacey Manufacturing Co., Los Angeles.

R. H. Ingle, resident engineer at Lebanon, goes to Dillwyn as resident engineer; **C. M. Gillespie,** resident engineer at Rocky Mount, to Lebanon as resident engineer; **A. J. Mills,** resident engineer at Petersburg, to Rocky Mount as resident engineer; **C. F. Kellam,** resident engineer at Warsaw, to Petersburg as resident engineer; **H. H. Holmes,** resident engineer at Dillwyn, to Warsaw as resident engineer; **J. M. Wray, Jr.,** inspector, to Christiansburg as assistant resident engineer; **C. L. Ellington,** inspector, to Charlottesville as assistant resident engineer; and **P. B. Coldiron,** acting assistant resident engineer at Staunton, to assistant resident engineer at Staunton.

E. F. Barratt, formerly city engineer of North Bay, Ont., has been named city engineer of Weston, Ont.

L. P. Zimmerman, engineer of Hennepin County, Minn., has been appointed consulting engineer by the Wayzata city council to prepare plans for improving that Minneapolis suburb's Lake Street from Broadway to Barry Ave., a 4-block stretch fronting on Lake Minnetonka.

G. B. Robeson has resigned as superintendent of public works for Hickory, N. C., to join the Elliott Building Co. as supervisor of construction work at Rhodhiss, N. C.

Edmond H. Hoben, of Chicago, Ill., has been named executive director of the Minneapolis, Minn., housing and redevelopment authority. He has been an economic analyst with the Public Works Administration, Washington, D. C., and supervisor of 12,000 housing authority units at Detroit, Mich.

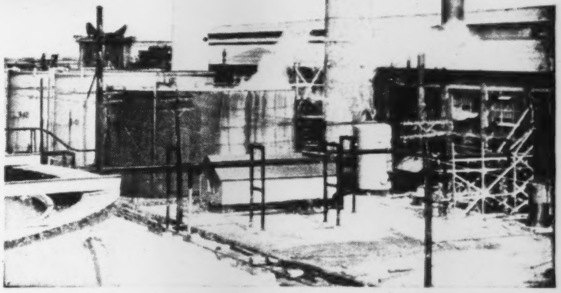
Commander Hugh L. Crawford of Winnipeg, Man., formerly assistant superintendent for the Hudson Bay Mining and Smelting Co., in Manitoba, has been appointed deputy engineer in chief of the Royal Canadian Navy, with headquarters at Ottawa.

Edwin C. Fraser recently retired as bridge engineer of the Florida State Highway Department.

Edward S. Taub has established an office for the practice of consulting engineering at 161 East 32d Street, New York 16, N. Y.

Paul Morgan, city engineer of Algona, Iowa, has resigned to go with a firm of consulting engineers, Belmond, Iowa.

How to Cut Maintenance Costs 3 Ways!



GULF OIL CORP.
Port Arthur, Texas
Applier:
NOACK BROTHERS
Port Arthur, Texas

PROTECT STACK SURFACES... Subjected to every climatic change, plus extreme conditions of vibration and high temperatures, stacks are a frequent and continuing source of maintenance expense. That is until they are protected by a tough, long-lasting coating of Arco Stack Dum Dum. Then they shrug off weather and other maintenance-provoking conditions because Stack Dum Dum's elastic coating permits ample expansion and contraction to withstand heat, cold and vibration.

PROTECT BUILDING SURFACES... Where cracks appear in concrete, stucco or other masonry building surfaces, it's time to apply a thick, tough but elastic coating of Dum Dum Masonoc. This time-proved Arco product seals cracks, stops moisture seepage and prevents the need for much costly reconstruction.

PROTECT METAL SURFACES... Dum Dum for Metal protects any metal surface against the hazards of rust, corrosion, weather wear... even industrial fumes and gases.

FOR COMPLETE INFORMATION ON ALL 3 PRODUCTS—MAIL THIS COUPON TODAY

THE ARCO COMPANY
Dept. EN6, 7301 Bessemer Ave., Cleveland 4, Ohio

☐ Please send booklets describing Stack Dum Dum, Dum Dum Masonoc, Dum Dum for Metal.
☐ Please supply names of appliers operating in this locality.
☐ Please have sales representative call.

Name__________
Address__________
City__________ Zone_____ State_____

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THE ARCO COMPANY
CLEVELAND • LOS ANGELES

CEMENT GUN COMPANY
"GUNITE" CONTRACTORS
GENERAL OFFICES—ALLENTOWN, PENNA., U.S.A.

SAVED WITH "GUNITE"

Above is shown the stadium of Sharon High School at Sharon, Penna. This is a poured concrete structure, built in 1933, and after only eight years disintegration was very serious and endangered the stability of the structure.

In 1941 we were called upon to strengthen and recondition this stadium, which we did with reinforced "GUNITE" of two inch minimum thickness.

The view to the left shows the chipping and sandblasting completed and the reinforcing mesh in place. To the right is the completed job, better than when new. This is just one of many similar and kindred jobs which we have done with "GUNITE," dozens of which are described in our Bulletin A2300.

Write today for your free copy of bulletin A2300

MANUFACTURERS OF THE "CEMENT GUN"

CON—VAY—IT
CUTS CONSTRUCTION COSTS

Contractors using this marvelous new Concrete Conveyor are saving as much as 80% on the cost of pouring concrete. CON-VAY-IT speeds the job too! *Electrically operated,* it delivers up to a cubic yard of wet concrete a minute — down, horizontally, or to a height of 8 ft. Other models are available for greater heights. *It will pay you well* to put CON-VAY-IT 12-20 Concrete Special to work for you without delay—write *TODAY* for details.

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Elections and Activities

James E. Morrison of Renton, Wash., has been elected chairman of the Northwest section of the American Water Works Association. B. C. Gosney of Auburn, Wash., was named vice-chairman and W. C. Wilmot of McMinnville, Ore., trustee. Fred Merryfield of Corvallis, Ore., was re-elected secretary-treasurer.

J. Lloyd Walker, secretary of George W. Walker & Sons, Inc., has been elected president of the Engineering Society of Buffalo, N. Y. He succeeds George T. Parker Jr. Other new officers to be installed in September are: Vice-president, George R. King; secretary, Volney M. Holmes, and treasurer, Clarence J. Hayes. Directors elected for 3-year terms are Richard G. Harper, Orval C. Morris, George Nachbaur and Charles D. Zacher.

The Monroe Chapter of Professional Engineers, Rochester, N. Y., has elected the following officers: Lewis J. Sforzini, president; John Lewis, vice-president; Hiram W. Barnes, treasurer; L. Dilwin Jackson, secretary. New directors nominated are: H. Remington Kohler, A. P. Boehmer, E. K. Haas. The chapter has shown a membership increase of 370% in the last two years.

The Technical Societies Council of New York, representing about 25,000 engineers in the metropolitan area, has elected officers as follows: President—C. S. Purnell of the American Institute of Electrical Engineers, in charge of the petroleum section, industry department, Westinghouse Electric Corp., 40 Wall Street; Vice-president—C. B. J. Fraser of the American Institute of Mining and Metallurgical Engineers, assistant manager of the development and research division, International Nickel Co., 67 Wall Street. Secretary—W. F. O'Connor of the American Chemical Society, associate professor of chemistry at Fordham University. Treasurer—M. C. Giannini of the American Society of Heating and Ventilating Engineers, associate professor of air conditioning at New York University.

Victor Kerr, Painesville, Ohio, has been elected president of the Northeastern chapter, Ohio Society of Professional Engineers, succeeding Fred Kessler, Ashtabula, a state engineer. Frank Shelton, Geauga County, is vice-president, and Richard M. Plummer, Painesville, secretary-treasurer.

Manufacturers' Activities

Current developments among manufacturers relating to expansion of services, shifts in personnel, and other changes, include the following:

Sales—PALMER FILTER EQUIPMENT Co., Erie, Pa., has appointed ALHYDRO, INC., Baltimore, Md., distributors for Palmer filter bed agitators and Anthrafilt filter medium . . . William Mooney II of Spartanburg, S.C., is sales representative for the UNIVERSAL CONCRETE PIPE Co., Atlanta, Ga., for the southeastern area . . . AMERICAN STEEL & WIRE Co. has made Earl N. Graf director of wire rope sales for the eastern district, W. C. Anderson director of construction material sales for that district and Geo. H. Cruttenden, assistant manager . . . Joseph O'Grady is supervisor of water meter sales for the Pittsburgh district office of the PITTSBURGH EQUITABLE METER division of the ROCKWELL MFGR. CO. . . . MARION POWER SHOVEL Co. has appointed Paul Fenwick manager of the New York sales office . . . LUSTRON CORP. has named Richard N. Jones vice-president in charge of sales . . . J. Douglas Darby has been elected vice-president in charge of sales for the CARNEGIE-ILLINOIS STEEL CORP., in place of Thos. J. Hilliard, resigned . . . Uri B. Grannis, Jr., has been made manager of equipment sales for the AMERICAN BRAKELOK division, AMERICAN BRAKE SHOE CO. . . . Jas. W. Lafferty is technical sales engineer for the IRA G. PERIN CO., San Francisco, material-handling equipment distributor . . . Chas W. Mackett is manager of sales operations for the HEWITT RUBBER division of HEWITT-ROBINS, INC. . . . Wm. W. Criswell, Jr., is sales representative in New York for the AMERICAN WHEELABRATOR & EQUIPMENT CORP., Mishawaka, Ind. . . . THOS. C. WILSON, INC., Long Island City, N. Y., pipe and tube cleaning equipment, has named these new sales representatives: STEEL & ENGINEERING PRODUCTS, El Paso, Tex.; INTERSTATE MACHINERY AND SUPPLY Co., Omaha, Neb.; PLIBRICO SALES AND SERVICE Co., Charlotte, N.C.; LEINERT ENGINEERING Co., Knoxville, Tenn.; and KIGER SUPPLY Co., Detroit, Mich. . . . Lewis W. Klockner, Jr., is eastern sales manager for the VAPOR RECOVERY SYSTEMS Co. of Compton, Calif. . . . Littleton C. Barkley has been appointed general sales manager, asbestos and rubber products, West Coast division, RAYBESTOS-MANHATTAN, INC.

Distributors—AIRTEX CORP., 333 No. Michigan Ave., Chicago, is the exclusive

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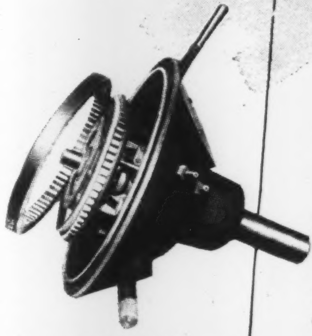
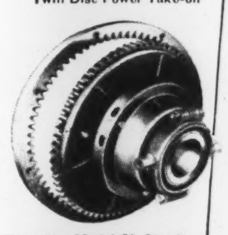
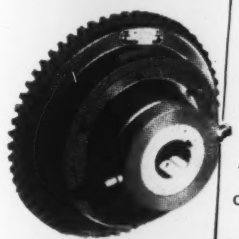
"NEW LOOK"
in Construction
Equipment



Twin Disc Power Take-off



Twin Disc Model CL Clutch



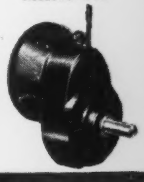
Twin Disc Model EH Clutch

The first style show for heavy-duty construction equipment since before the war . . . the 1948 Road Show . . . gives manufacturers the opportunity to unveil new models with a "new look."

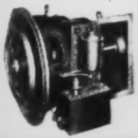
Twin Disc Clutches and Power Take-offs, controlling and transmitting power on the sleek new models of many manufacturers, will be on exhibit at this Chicago Road Show too. These power transmission devices have been built into heavy-duty road-building equipment since the industry began to boom in the early twenties . . . and Twin Disc developments have kept pace with improvements in design and construction so evidently at a new high today.

Twin Disc Heavy-duty Model CL and EH Clutches and Twin Disc Power Take-offs answer the demand for compact, enclosed power transmission units that can deliver the engine's full horsepower and torque. They are available in one, two and three-plate construction, sizes from 5.5" up to 42" (6.5" to 24" for Power Take-offs) and capacities up to 875 hp (650 hp for Power Take-off). For complete information write for CL Bulletin No. 120-C, EH Bulletin No. 108-D and Power Take-off Bulletin No. 129-B. TWIN DISC CLUTCH COMPANY, Racine, Wisconsin (Hydraulic Division, Rockford, Illinois).

See the Twin Disc exhibit in Booth 1212 at the 1948 Road Show, Soldier Field, Chicago, July 16 to 24.



Reduction Gear



Hydraulic Torque Converter

Machine Tool Clutch

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CLUTCHES AND HYDRAULIC DRIVES
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SPECIALISTS IN INDUSTRIAL CLUTCHES SINCE 1918

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DUMPCRETE
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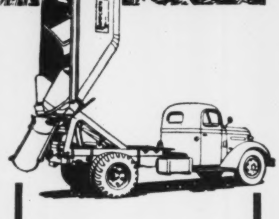
CONCRETE PLACED
"Way under Estimates"

It looked like a high-cost job—laying telephone conduit down narrow alleys in Front Royal, Va. Wheelbarrows were figured for concrete placing, as heavy truck mixers would break down the trench walls.

The estimator's face lit up when W. R. Miller wheeled his light-weight Dumpcretes right over the ditch. This fast, direct, low-cost method dropped costs "way under estimates."

Even on ordinary jobs Dumpcrete Concrete is cutting costs. Reports from users in 42 states show savings of $1.00 and more per yard. And with preferred air-entrained concrete they're getting top-to-bottom *uniformity* on every load.

You can deliver concrete "way under estimates" too. Write today for booklet "A Special Utility Body for Hauling Air-Entrained Concrete."



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Lightweight, watertight, loads fast, dumps fast or slow, places anywhere, costs less to buy and run. Ideal for hauling aggregate, coal and earth.

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wholesale distributor in that area for the Tracy Mfgr. Co. . . . H. B. Landis will sell and promote Tournalayer and Tournamixer equipment on the West Coast for R. G. LeTourneau, Inc., Longview, Tex., and A. G. Quinn will handle Tournacrane and Tournahauler machines exclusively in that area . . . Davey Compressor Co. has appointed Evans Machinery & Equipment Co., Philadephia, Pa., to a class "A" dealership . . . Martin Wiegand, Inc., and United Clay Products Co., both of Washington, D.C., will handle Richkraft products in that area . . . Leary & Owens Machinery Co. Inc., Birmingham and Montgomery, Ala., will service and handle power graders, maintainers, power sweepers, tilt-bed trailers and street, industrial and highway line markers in Alabama for Meili-Blumberg Corp., New Holstein, Wis. . . W. Howard Minton is the new Gulf coast representative for Macwhyte, Kenosha, Wis. . . . Torrington Pump Supply & Engineering Co., Torrington, Conn., has been appointed New England distributor for products of the Johnston Pump Co., York, Pa., and Los Angeles, Calif., including the Johnston deep and shallow well jet type pumps and deep well turbines.

Personalities—After 48 years service with Bemis Bro. Bag Co., Reuben H. Brown, manager of the New Orleans plant will retire from that position but will remain as special representative. . . Frederick E. Byrnes, formerly assistant to the president of The Ruberoid Co. has been elected vice-president in charge of industrial relations. . . Wm. L. Batt, president of SKF Industries, Inc., for his pioneer work in the manufacture of ball and roller bearings has been given the "Pioneers of Industry" Award by students of the Murrell Dobbin Vocational-Technical School, Philadelphia, Pa. . . . Gilbert W. Chapman, former president of the American Water Works Co. Inc. has been appointed vice-president in charge of finance of The Yale & Towne Mfgr. Co. . . . Raymond H. Schaefer has been made director of research and development for the American Brake Shoe Co.

Deceased—Robert B. Jennings, 47, manager of the Columbus, Ohio, branch of the Trane Co., and prior to that for 14 years a designer in the Columbus city division of engineering, died May 27 in that city. He served 18 months with the Seabees in the South Pacific. He became a commander before leaving the service in November, 1945.

Miscellany—E. D. Bullard Co., San Francisco, a pioneer in industrial safety

READY TO USE UNI-FORM SYSTEM
FAST START—FAST FINISH

INDUSTRIAL
FLOOD CONTROL

Illustrating the rigidity of UNI-FORMS with only one-side alignment.

Note pleasing appearance, sharp, accurate corners of these UNI-FORMED buildings.

SAVE TIME, LABOR, MATERIALS

The UNI-FORM System is widely used for every type of concrete construction—it combines unusual versatility with extremely low material and labor cost . . . factors which add up to better, faster, more economical building.

The plywood faced, steel-framed UNI-FORMS are faster to erect, easier to strip and require alignment on one side only. Simple mechanical assembly with UNI-FORM Ties and Tie Keys produces a tight, rigid form which assures walls of uniform thickness from top to bottom. Special forming requirements such as pilasters, offsets, brick ledges, etc., are easily handled.

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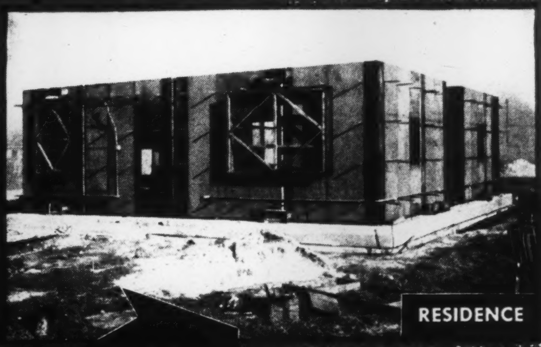
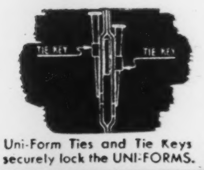
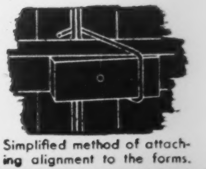
It will pay you to investigate the many advantages the UNI-FORM System can bring to your concrete form work. Try them . . . we know you will buy them.



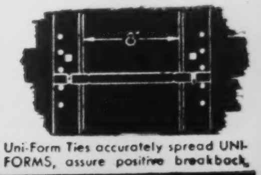
Inside forms erected—conduit, ducts, window frames nailed directly to the UNI-FORM face.



Uni-Form Ties and Tie Keys securely lock the UNI-FORMS.



Simplified method of attaching alignment to the forms.



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BUILDINGS ALL TYPES
Fabricated and Completely INSTALLED
$1.50--$2.50 Per Sq. Ft.*

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equipment, celebrates its 50th anniversary this year. . . Mahogany colored vitrolite, popular before the war for store fronts, vestibules, etc., is available again says Libbey-Owens-Ford Glass Co. . . . Jefferys Engineering & Equipment Co., Raleigh, N.C., on July 1 will transfer to the Guilford Bldg., Greensboro, N. C. . . . Rockwell Mfg. Co., Pittsburgh, Pa., has bought Red Star Products, Inc., Norwalk, Ohio. This rounds out the line of woodworking power tools manufactured by Rockwell's Delta Mfgr. division, Milwaukee, Wis. . . . The Pumice Producers Association has just been formed, with Jack Foster of Pumice Aggregate Sales Corp., Albuquerque, N.M., as president. At the organization meeting in Los Angeles, it was brought out that pumice concrete is low cost, has high insulating values, and high structural strength. It is thought to be especially suitable for use in low-cost housing on a mass scale.

World Bank reports loans totalling $500 million

With the approval, at the end of March, of loans to two Chilean corporations in the amount of $16,000,000 for the development of hydro-electric power and agriculture, the World Bank announces that its total loan commitments now stand at $513,000,000. Against these commitments, disbursements comprise $403,000,000, and field representatives of the bank stationed in the various borrowing countries are insuring that the loans are used only for the productive purposes specified in the loan agreements. At the present time, the bank has field representatives for this purpose in Paris to supervise the $250,000,000 loan there; at The Hague in the Netherlands on a $195,000,000 loan; at Copenhagen, Denmark for a $40,000,000 loan; and in Luxembourg for a loan of $12,000,000. The French loan has been used to finance the purchase of 7,000,000 tons of coal; some 30,000 tons of copper used to manufacture copper wire for the French power distribution system; for the purchase of 175,000 bales of cotton; for equipment to replace that damaged by the war in the Renault automobile plant; to purchase earth-moving equipment to be used in building hydro-electric power dams in the Rhine and Rhone valleys; and to finance about 50 percent of the purchase price of a new 1,000,000 ton-a-year steel mill to be erected in 1949. The Luxembourg loan is also to be used for partial financing of a new steel mill. The Denmark loan went for a cable and wire works and for agriculture, while that to Holland is being used to purchase merchant ships and tankers, building materials and fertilizers.

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GENERAL ELECTRIC

CONSTRUCTION REPORTS

Proposed Work

Compiled by Business News Department—Engineering News-Record, 330 W. 42nd St., New York 18, N. Y.
ELSIE EAVES, Manager J. A. MAHONEY, Reports E. R. BIGGERSTAFF, M. R. ROESSLER, Statistics

WATER SUPPLY

PROPOSED WORK

●**Ark., Fayetteville**—City, constructing lake near here as source of city's water supply. **$1,000,000.** Edgar J. Brown, city engr.

D. C., Wash.—Govt. District of Columbia, Purchasing Div., East Administration Bldg., 300 Indiana Ave. N.W., Zone 1, purchasing 10 major pumps and motors, Bryant St. Pumping Station. **$300,000.** CD 7/14/44—ENR 7/27/44.

La., Bogalusa—City, bond election July 6, imprv. WW. **$155,000.**

Mass., Attleboro—City, Mayor's Office, City Hall, watermains, exten. into Reed St., Bishop St. and Pike Ave. **$200,000.**

N. M., Las Cruces—City, voted bonds WW sys., imprvs., extens. **$275,000.**

†**Oregon**—U. S. Eng. 628 Pittock Block, Portland, Zone 5, water supply and sewerage sys. for operator's residence at Fern Ridge Dam, approx. 5 mi. north of town of Elmira, Serial No. Eng-35-026-48-857. CD 1/12, under Public Buildings.

●**Tex., Brownsville**—City, H. L. Stokely, bond election July 17, water purification or filtration plant, **$1,000,000;** 2 m.g. clear water storage and lines, **$250,000.** Sigler, Clark & Winston, P.O. Box 157, Weslaco, consult. engrs. CD 3/9—ENR 3/11.

Tex., Dublin — City, B. F. Shoemaker, mayor, voted bonds, WW imprvs. **$115,000.**

Tex., Galveston—Galveston County Water Co., Galveston, huge earth water reservoir, capacity of 8,000 acre-ft for industrial usage, mostly. **$750,000.**

Tex., Hamilton—City Jess Brown, mayor, filtration plant, **$60,000;** water distr. sys. **$50,000.** Fred E. Hess, Inc., Fort Worth Natl. Bank Bldg., Fort Worth, consult. engr. CD 4/22—ENR 5/13.

●**Tex., Longview**—City, voted bonds, WW sys. extens., imprvs. **$1,175,000.**

Wash., Westport—Town, Town Hall, water sys., 5 wells, elevated tank and distr. sys. **$278,000.** A. K. Stillman, Chambers Bldg., Olympia, consult. engr.

Wis., Theresa—Village, WW sys. **$145,000.** McMahon Eng. Co., Menasha, consult. engr.

Wis., West Allis—City, 1¼ mi. 30 in. feed watermain in S. 76 St. **$200,000.** P. Burbach, city engr. CD 7/12/45—ENR 7/26/45.

SEWERS, WASTE DISPOSAL

PROPOSED WORK

Calif., Los Angeles—Bd. Supervs. Los Angeles Co., 501 Hall of Records, sanitary sewers, Glen Ave., Altadena, C. 1. 1,256, **$212,000;** Layton St., Altadena, C. 1,255, **$152,500.**

●**Calif., Mill Valley**—Southern Marin Sanitation Dist., City Hall, defeated **$1,875,000** bonds, sewage disposal works. CD 4/29—ENR 5/13.

●**Calif., San Francisco**—Dpt. P. Wks., City Hall, approved $15,000,000 bond issue, sewage treatment plants, one near Bay and Kearny St., one in Islais Creek area near Quint St. and Jerrold Ave. **$25,000,000.** R. Wadsworth, city engr. Clyde C. Kennedy, 604 Mission St., San Francisco, consult. engr. CD 4/13—ENR 4/29.

Calif., San Francisco—Dpt. P. Wks., City Hall, Lake Merced Street Sewer Sect. 2, involving 2,900 ft. 6 ft. 6 in. diam. rein.-con. pipe structure. **$250,000.** Ralph Wadsworth, city engr.

Calif., Walnut Creek—Central Contra Costa Sanitary Dist., 1335 Commercial Lane, lateral collection system in Imprvt. Area 2, about 1100 acres residential area, near here. **$446,160.** Clyde C. Kennedy, 604 Mission St., San Francisco, consult. engr.

Ind., Mishawaka—Bd. P. Wks., F. J. Millers, mayor, chn., City Hall, storm relief sewer, Spring St. **$450,000.** Chas. W. Cole & Son, 220 W. La Salle St., South Bend, consult. engrs.

La., Bogalusa—City, bond election July 6, sewage disposal works. **$555,000.**

N. J., Trenton—City, City Hall, 3,000 ft. 36 in. vitr. Sewer 902 along proposed Freeway, East Front to Lamberton Sts. **$100,000.** Joseph English, Trenton, city engr.

N. M., Albuquerque—City, sewerage disposal plant addn. **$125,000.** Hasie & Green Eng. Co., P. O. Box 1139, Lubbock, Tex., consult. engrs. CD 1/10/46—ENR 1/24/46.

N. M., Las Cruces—City, voted bonds sanitary sewerage sys. extens., imprvs. **$225,000.** CD 1/10/46—ENR 1/24/46.

●**O., Toledo**—City sewer imprvs., Dist. 23, Nevada, Navarre, Maumee River in East Toledo, **$1,194,000;** Dist. 61, Sylvania, Bancroft, Secor area, **$3,000,000;** Dist. 62, Sheridan-Broadmoor, **$203,000;** South St. Clair St. **$30,000.** Karl Nelson, city engr.

●**Ore., Salem**—City, City Hall, voted bonds, interceptor sewer from sewage disposal plant to Columbia St. **$185,000;** interceptor sewer, Columbia to Union Sts. **$215,000;** sewerage disposal plant, **$600,000;** trunk and lateral sewers in north end, **125,000;** trunk and lateral sewers in south end, **$267,000;** trunks and laterals in area to be annexed, **$75,000.** CD 10/2—ENR 10/16.

Pa., Bangor—Bangor Boro, sewerage sys. and sewage treatment plant. **$600,000.** Gannett, Fleming, Corddry & Carpenter, Inc., 600 N. 2 St., Harrisburg, consult. engr.

Pa., Forty Fort—Forty Fort Boro, sewerage treatment plant. **$400,000.** Gannett, Fleming, Corddry & Carpenter, Inc., 600 N. 2 St., Harrisburg, engr. CD 1/12—ENR 1/24/45.

Tex., Brownsville—City, bond election July 17, sanitary sewerage sys. extens. and imprvs. **$100,000.** Sigler, Clark & Winston, P.O. Box 157, Weslaco, consult. engr.

Tex., Dublin — City, B. F. Shoemaker, mayor, voted bonds, sanitary sewer extens., sys. imprvs. **$130,000.**

Wis., Theresa—Village, sewers and sewage treatment plant. **$126,000.** McMahon Eng. Co., Menasha, consult. engr. and archt.

●**Ont., Ottawa**—City, 11 ½ mi. 10 ft. diam. sewers from outlet in Ottawa River to Bronson Ave., north from Pooley's Bridge to Grahams Bay. **$500,000** per mile. F. A. Asquith, Transportation Bldg., engr. CD 10/20/43—ENR 1/28/43.

BRIDGES

PROPOSED WORK

Calif., San Francisco—Dpt. P. Wks., City Hall, Islais Creek Twin-Leaf Bascule Bridge across Islais Creek. **$800,000.** Ralph Wadsworth, city engr. CD 2/5/45—ENR 2/22/45.

Conn., Hamden—Town, Bd. Selectmen, Town Hall, and New York, New Haven & Hartford R.C. Co., E. E. Oviatt, ch. engr., 71 Meadow St., New Haven, Zone 6, widening railroad underpass, Putnam Ave. **$110,000.** F. W. Wright, town engr. CD 5/9/44—ENR 5/18/44.

Fla., Port Orange—Town, bridge over Halifax River. **$800,000.** Coverdale and Colpitts, 120 Wall St., New York, N. Y., consult. engrs.

●**Pennsylvania** — Pennsylvania Turnpike Comn., Harrisburg, high level 4 lane bridge to carry eastern exten. of Pennsylvania Turnpike over Susquehanna River at point between Marsh Run and Highspire. **$4,000,000.** Parsons, Brickerhoff, Hogan & McDonald, 142 Maiden Lane, New York, N. Y., consult. engrs., R. B. Stone, c/o owner, ch. engr.

Tenn., Knoxville — Knox Co., rebuilding Boyds Bridge over Holston River. **$350,000.** Patchen & Zimmerman, Augusta, Ga., and Retenbach Eng. Co., Knoxville, assoc. engrs. CD 3/5/45—ENR 3/22/45.

STREETS AND ROADS

PROPOSED WORK

Indiana—State Hy. Comn., John H. Lauer, chn., State House Annex, Indianapolis, reconstructing, widening four 11 ft. traffic lanes, two 8 ft. parking lanes 2.1 mi. long, W. Washington St. from White River to Eagle Creek, Marion Co. **$500,000.** C. E. Vogelsang, c/o owner, ch. engr.

O., Toledo—City, arterial route into West Toledo, through imprv. of Cherry St. from bridge to Collingwood Blvd.; Detroit Ave. from Collingwood to Phillips Ave.; Phillips Ave. from Detroit to Sylvania and Wolcott Blvd. from Berdan to Detroit Ave., incl. construction mid-street safety channels and removal of street car rails from Cherry St. **$150,000.** Arnold V. Finch, city engr.

●**Pennsylvania** — Pennsylvania Turnpike Comn., Harrisburg, 4.6 mi. Eastern Exten. of Pennsylvania Turnpike from point near Mt. Hope to an intersection with Route 322, Lancaster Co., **$1,000,000.** Michael Baker, Jr., Inc., Rochester, consult. engr.; 3.2 mi. eastern exten. Pennsylvania Turnpike, from intersection with Route 24, south of New Cumberland to west bank of Susquehanna River east of Marsh Run, York Co., **$1,000,000.** Capitol Eng. Corp., Dillisburg, consult. engr.; 4.2 mi. eastern exten. Pennsylvania Turnpike from point on Traffic Route 341 near Black Oak School to The Dauphin-Lebanon Co. line, Dauphin Co., **$1,000,000;** Gannett, Fleming, Corddry & Carpenter, Inc., 600 N. 2 St. Harrisburg, consult. engr. R. B. Stone, c/o owner, ch. engr.

●**Pennsylvania**—Pennsylvania Turnpike Comn., Harrisburg, exten. Pennsylvania Turnpike from Middlesex to point east of Paoli, at King of Prussia, incl. high-level short span bridge over Susquehanna River south of Harrisburg, **$70,000,000.** Gannett, Fleming, Corddry & Carpenter, Inc., 600 N. 2 St., Harrisburg, consult engr. R. B. Stone, c/o owner, ch. engr.

R. I., Providence—City, C. F [illegible] dir. P. Wks., City Hall, bituminous asphalt on 8 in. concrete paving, Broad St. $500,000. Andrews & Clarke, 305 E. 63 St., New York, N. Y., consult. engrs. CD 4/16—ENR 4/29.

Texas—State Hy. Comn., Austin, [illegible] structures, storm sewers and concrete paving 1.14 mi. Hy. US 75, Proj. U [illegible], Dallas. **$935,000.** D. C. Greer, Austin, engr.

Tex., Bonham—Fannin Co., voted bonds, reconstruction and asphalt paving Road Dist. 6, **$150,000;** Road Dist. 4, **$75,000.**

Tex., Gonzales—Gonzales Co., c/o Judge, voted bonds, farm-to-market road construction, 11 mi. from near Gonzales to Lavaca Co. line near Moulton, **$85,000;** 10 mi. from Moulton Rd. to Dilworth, **$75,000;** 14 mi. between Gonzales and U.S. Hy. near Garwood, **$83,000.** CD 4/14—ENR 4/29.

Tex., Griffing Park (P.O. Port Arthur)—City, C. W. Ellis, mayor, 10½ mi. street paving, **$850,000** if concrete and **$581,000** if asphalt. Charles P. Smith, Orange, consult. engr.

EARTHWORK, WATERWAYS

PROPOSED WORK

●**Pennsylvania**—Dpt. Forests & Waters, Harrisburg, flood control and recreation dams Whiteley Creek, Greene Co., **$655,000;** on Shawnee Branch of Juniata River, Bedford Co., **$1,200,000;** Little Pine Creek, Lycoming Co., **$2,800,000.**

Tex., Borger—Phillips Petroleum Co., Bartlesville, Okla., water flood project, in refinery zone. **$100,000.**

●**Tex., Houston** — City, M. H. Westerman, secy., earthen dam for industrial and domestic use on San Jacinto River, near here. **$7,000,000.** Howe & Wise, 4119 San Jacinto St., consult. engrs. CD 10/18/46—ENR 10/24/46, under LB.

Tex., Kerrville—Kerr Co. Agriculture & Conservation Assn., c/o Guy Powell, Kerrville, 313,500 rods cross-fencing, etc. **$350,000.**

●**Ontario**—South Nation Conservation Comn., Alex Roger, secy., Gloucester, flood control channel cut from South Nation River to St. Laurence River, Spencerville. **$2,000,000.**

AIRPORTS AND AIRBASES

PROPOSED WORK

Conn., Hartford—RUNWAY—City, Municipal Bldg., 550 Main St., reconstructing Southeast Northwest Runway, Brainerd Field. **$300,000.** CAA. E. Skilton, city engr.

†**Conn., Windsor Locks**—AIRPORT—State Brig. Gen. F. G. Reincke, Hartford, hangar, communications, administration, warehouse bldgs., runway exten. to 7,000 ft. aprons taxiways at Bradley Field. **$883,500.** CD 9/2/43—ENR 9/23/43.

●**Fla., Miami**—AIR TERMINAL, etc.—Dade Co. Port Authority, Miami, air passenger terminal, international center, at Miami International Airport. **$2,000,000,** incl. land. Earle M. Rader, Miami, co. engr.

Ind., Evansville—AIRPORT IMPRVS.—Bd. Aviation Comrs., J. D. Beeler, chn., City Hall, airport imprvs., incl. terminal, administration bldg., paved roadways, parking areas, runways, taxiways, lighting. **$800,000.** Bonds voted. CD 2/28/45—ENR 3/18/45.

●**Md., Baltimore**—AIRPORT—City of Baltimore Aviation Comn., 1105 Municipal Bldg. Contr. 9, airport terminal, service bldg., plant, switching station, garages, shop, etc. Friendship Church. **$3,000,000.** Whitman Requardt, Greiner Co. & Assoc., 11 Mount Royal Ave., engrs. CD 10/21/43—ENR 11/28/43.

Wash., Pullman — AIRPORT IMPRVS. — Moscow-Pullman Airport Bd., City Hall, Pullman, asphalt concrete surfacing runway at airport, **$125,542.** B. Nelson, city engr., City Hall, Pullman, and H. J. Smith, city engr., City Hall, Moscow, Idaho. CD 1/23/45—ENR 4/5/45.

FOREIGN

British Guiana, Georgetown—Trinidad Trust Co., Georgetown, plans by R. N. Singh, [illegible] Church St., Georgetown, theater. **$250,000.**

LATIN AMERICA

Argentina, Buenos Aires—Republic of Argentina, Buenos Aires, plans factory. **$500,000.**

Argentina, Buenos Aires—Republic of Argentina, Buenos Aires, plans railway from Rio Turbio coal mines to nearest Patagonian port. Over **$1,000,000.**

LATIN AMERICA (Cont'd.)

Argentina, Buenos Aires—Republic of Argentina, Buenos Aires, plans tin plate mill and tin smelter. **$1,000,000.**

Argentina, Puerto Belgrano—Direccion General de Construcciones Terrestres, Avda, Eduardo Madero 351, Buenos Aires, plans piers for torpedo boats in Naval Base of Puerto Belgrano for Argentine Navy Dpt. (Ministerio de Marina). **$1,000,000.**

Bolivia, Santa Cruz—Municipality, plans sewerage sys. **$300,000.**

Bolivia, Sucre—Municipality, plans sewerage and water sys., repair damage done by Mar. 27 earthquake. **$500,000.**

B.W.I., Bridgetown — Govt. of Barbados, Bridgetown, plans school and health center, **$250,000;** slum clearance and housing, over **$500,000.** Dpt. P. Wks., Bridgetown, engr.

Mexico, Frontera—Mexican Govt., Scrita. de M., Mexico, D. F., plans wharves and breakwaters. **$49,500,000.**

Mexico, Hidalgo del Parral—Eagle Picher Mining and Smelting Co. (Harold Blackwood, genl. mgr.) Juarez, 64, Mexico, D. F., plans warehouse, 50 bed hospital at Esmeralda mine. **$250,000.**

Mexico, Leon — Municipal Govt., Palacio Municipal, Leon, Gto., Mexico, plans street paving. **$1,275,000.**

Mexico, Mexico City—Azteca Studios, Mexico City, plans reconstructing studios and warehouse. **$700,000.**

Mexico, Mexico City—Guanos y Fertilzantes, S.A., Carranza 25, Mexico City, plans by General Manager, Carlos Benites, Carranza, 25, Mexico City, ammonium, sulfate and sulfuric acid plant. **$1,000,000.**

Mexico, Mexico City—Holiday on Ice de Mexico (Victor Sturdivant, impresario), Juarez, 64, Mexico, D. F., plans roofed 20,000 seat ice spectable studium. **$750,000.**

Mexico, Mexico City—Municipal Govt., Palacio Municipal, Mexico, D.F., Mex., plans 6 public markets, reconditioning eight markets. **$12,500,000.** CD 10/17—ENR 10/30.

Mexico, Mexico City—Jorge Pasquel, Ramon Guzman, 71, Mexico, D.F., plans 6 residences. **$1,500,000.**

Mexico, Monclavo—Altos Hornos de Mexico, V. Carranza, 25, Mexico, D.F., plans iron and steel plant imprvs., featuring coke ovens and chilled steel and electric generating plant. **$8,600,000.**

Mexico, Nuevo Laredo—Republic of Mexico, Treasury Dpt., Mexico City, plans customs and immigration bldg. **$300,000.** Manuel F de la Garza, 504 Guerrero Ave., Nuevo Laredo, engr.

Mexico, Nuevo Laredo—Union Ganadera Regional de Nuevo Laredo, c/o Banco de Nuevo Laredo, Nuevo Laredo, plans meat packing and cold storage plant. **$300,000.** Erasmo Flores, c/o owner, engr.

Mexico, Oaxaca—Mexican Govt., Scrita. de C.y O.P., Mexico, D.F., plans 100 bed hospital for government employees. **$310,000.**

Mexico, Reynosa—Republic of Mexico, Mexico City, plans custom house bldg., etc. **$250,000.** Dpt. P. Wks., Mexico City, engr.

Mexico, Vera Cruz—Bernard Pasquel, Emilio Azcarraga & Assoc., Ayumiento, 54, Mexico, D. F., plans two 2,500 seat cinemas. **$1,000,000.**

Mexico, Vera Cruz—Federal Govt., c/o Dpt. P. Wks., Mexico City, plans cattle vaccine plant. **$2,000,000.**

Mexico, Vera Cruz—Mexican Govt., Scrita de la Marine, Mexico, D. F., plans military port (army-navy base). **$5,000,000.**

Paraguay, Asuncion—Republic of Paraguay, Asuncion, plans cement plant. **$700,000.** Public Enterprise Admin., Asuncion, engr.

Uruguay, Montevideo—Municipality plans bridge. **$150,000.**

PUBLIC BUILDINGS

PROPOSED WORK

● **Ill., Alton**—Alton School Dist. 151, Bd. Educ., c/o Superintendent Schools, 1211 Henry St., plans by Wm. B. Ittner, Inc., 408 Bd. Educ. Bldg., 911 Locust St., St. Louis, 1, Mo., rein.-con., brick, stone Junior High School for whites, **$600,000;** rein.-con., brick stone Junior High School for negroes, **$400,000.** CD 5/16—ENR 5/29.

UNCLASSIFIED

PROPOSED WORK

Arkansas and Louisiana — AUTOMATIC BLOCK SIGNALS, etc.—Missouri Pacific R.R., R. P. Hart, ch. engr., Missouri Pacific Bldg., 13 and Olive Sts., St. Louis 3, Mo., installing 48 mi. automatic block signals, 20 turnouts, etc., between McGehee, Ark., and Arkansas-Louisiana Line, **$219,300;** 25 mi. automatic block signals, turnouts, etc., from Arkansas-Louisiana line to Collinston, La. **$85,000.**

Texas—RURAL DISTRIBUTION LINES—Nueces Electric Co-operative, Robstown, 61 mi. rural distr. lines, sys. imprvs., completing previously approved construction, Nueces Co. **$193,000.**

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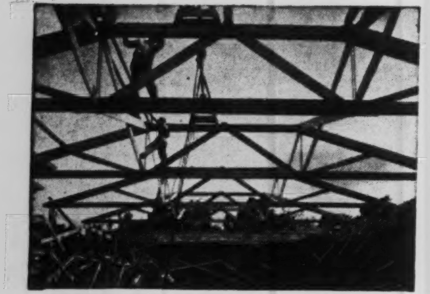

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CONSTRUCTION REPORTS

Bids—Contracts—First Section

WATER SUPPLY

BIDS ASKED

Bids Asked July 7

Mo., Cardwell—City, J. Steinberg, mayor, WW imprvs., incl. artesian well, turbine pumps, elevated tank and tower, small pump house, 25 fire hydrants, 250 service connections, etc. Plans deposit $10. Russell & Axon, 408 Olive St., St. Louis, Zone 2, engr.

Bids Asked July 8

Minn., Duluth—City, C. D. Jeronimus, clk., Duluth, 5 m. g. concrete reservoir. $200,000. Plans deposit $10. A. W. Tews, Duluth, city engr. CD 322—ENR 4/1.

Okla., Vian—Town, water treatment plant and present distr. sys. addns. $40,000. Cochran, Fell & Wheeler, Palace Bldg., Tulsa, engrs. CD 5/13/46—ENR 5/30/46.

LOW BIDDERS

N. Y., New Hartford—Town Bd., Louise Seaton, clk., Butler Memorial Hall, received no bids June 4, pump. station, storage tank, approx. 4 mi. 2- to 10-in. watermains, services. CD 5/10—ENR 5/13.

O., Bucyrus—City, WW and filtration-softening plant, from Richland Constr. Co., Mansfield, **$463,000.** Est. $387,000. CD 5/13—ENR 5/20.

CONTRACTS AWARDED

Calif., Oakland—East Bay Municipal Utility Dist., 512 16 St., supports for 69 in. O. D. steel pipeline, Unit C, and Mokelumne Aqueduct, Spec. 80, Contra Costa and San Joaquim Counties to Independent Iron Wks., 8 and Pine Sts. **$162,695.** Bids 5/12, awarded 6/8. CD 5/21—ENR 5/27, under LB.

Fla., Quincy—City, water supply filtration plant, imprv. water supply sys., to Huffman-Wolfe Co., Standard Bldg., Atlanta, Ga., **$80,566;** imprv. water supply plant, incl. changing source of supply from deep wells to Quincy Creek, to Albritton Williams, Quincy, **$109,480.** (**Correction**—location of project). Awarded 5/28. Robert & Co., Bona Allen Bldg., Atlanta, Ga., engrs. ENR 6/17, under Ia., Quincy.

Ind., Sullivan and Shelburn—Town Bd., Shelburn, watermains from Sullivan to Shelburn, to Ralph D. Green, Vincennes, **$70,000.** Est. $75,000. Awarded 6/5.

Okla., Fort Gibson—City, water supply and distr. sys., to H. J. Happell, Barnes Bldg., Muskogee, **$45,676.** Est. $47,000. Awarded 6/8. W. R. Holway, 302 E. 18 St., Tulsa, engr. CD 4/1/46—ENR 4/18/46.

Tex., San Antonio—H. B. Zachry Co., Transit Tower, c. i. waterlines, facilities, north of Terrell Hills, force account. **$40,000.**

SEWERS, WASTE DISPOSAL

BIDS ASKED

Bids Asked July 1

Calif., Walnut Creek—Central Contra Costa Sanitary Dist., 1335 Commercial Lane, installing about 115,000 ft. lateral collection sewer lines in Imprvt Area 2, near here. $446,160. Plans deposit $20. CD 6/2—ENR 6/17.

Bids Asked July 13

Wis., Clear Lake—Village, E. G. Hallen, clk., sanitary sewerage system, 25,366 lin. ft. 8-to 12-in. vitr. clay pipe, appurtenances, and lift station with force mains, sewage treatment plant. $163,450. Plans deposit $15. Banister Eng. Co., 1549 University Ave., St. Paul, Minn., engr.

Bids Asked July 19

Fla., Winter Park—City, sewage pump station, 750,000 GPD treatment plant. Plans deposit $25. Smith & Gillespie, P. O. Box 1048, Jacksonville, engrs. CD 9/18/46—ENR 10/3/46.

Bids Asked July 24

Calif., Walnut Creek—Central Contra Costa Sanitary Dist., 1335 Commercial Lane, oxidation ponds at Sewage Treatment Plant near Arnold Industrial Hy. Over $50,000. Plans deposit $10. CD 1/30—ENR 2/5.

Bids Asked July 26

Md., Towson—Baltimore Co. Comn., Courthouse, sewage pumping station, incl. equip., Contr. 3. Plans deposit $25. Wm. F. Neale, Towson, ch. engr.

Bids Asked About August 1

Kan., Liberal—City, Phil Minner, city mgr., storm, water sewerage sys. $400,000; sanitary sewer addns; extens. $75,000. H. R. Hunter, P. O. Box 1932 and 105 W. English St., Wichita, Zone 2, engr.

Ky., Richmond—City, sewage treatment plant. $200,000. H. de B. Forbes & Son, Richmond, engrs. CD 12/30—ENR 1/2

LOW BIDDERS

Calif., Los Angeles—Los Angeles Co. Sanitation Dist., 1206 Maple Ave., June 9, Water St. Trunk Sewer, from R. A. Watson Co., 5528 Vineland Ave., North Hollywood. **$144,308,** est. $100,000. CD 5/17—ENR 5/20; Alameda St. Extension Trunk Sewer, from George Miller, 3032 Bandini Blvd., **$308,991.** CD 5/28.

Calif., Los Angeles—Los Angeles Co., June 8, sanitary sewer, Durfee Ave. between Citronell St. and 1st alley south of Walnut Ave., Pico Dist., C. I. 1162, from B. Bosnyak Inc., 3014 Worthin Ave. **$299,400.** CD 5/17—ENR 5/20.

●**Calif., Napa**—Napa Sanitation Dist., City Hall, June 9, intercepting and main sewer lines, from E. E. Lowell, Box 148, Vallejo, **$330,301;** sewage pumping and treatment works, pumping plant and force mains, from P. & J. Artukovich, 13305 S. San Pedro St., Los Angeles, and Bebek & Brkich, 5025 E. Slauson Ave., Los Angeles, **$785,873.** Harry N. Jenks, 345 Madrono Ave., Palo Alto, engr. CD 4/26.

CONTRACTS AWARDED

Tex., San Antonio—H. B. Zachry Co., Transit Tower, sanitary sewers, drainage, north of Terrell Hills, force account. **$60,000.**

BRIDGES

BIDS ASKED

Bids Asked June 29

●**Virginia**—State Hy. Dpt., Richmond, addnl. borings for Yorktown Bridge (Proj. 1297-B1-T2 Contr. 2). Total est. $8,000,000.

Bids Asked July 2

Minnesota—State Hy. Dpt., St. Paul, Bridge 6546, 3 continuous I-beam spans, 239 ft. long over D. W. & P. R.R. 9.4 mi. northeast of Carlton, S.P. 6923-04 (Trunk Hy. 61-1), FGI 171 (4), St. Louis Co., Plans deposit $3.05; Bridge 6686, concrete deck girder spans, 40 ft. long over Mustinka River, 6.8 mi. northwest of Herman, S.P. 2601-08 (TH 9-152), S 507 (9), Grant Co., Plans deposit 90c. O. L. Kipp, St. Paul, ch. engr.

Missouri—State Hy. Dpt., Jefferson City, three 50 ft. I-beam spans Sta. 44 plus 64 over Cape La Croix Creek, Route 74 from Route 61 northeast to Sprigg St., Proj. U 52 (3), Cape Girardeau Co.; two 29 ft., one 100 ft. and one 33 ft. I-beam and truss spans Sta. 714 plus 00 over Clear Creek, Route SH, from Taberville southerly to Route 82, Proj. S 675 (5)-A, St. Clair Co.; two 75 ft. and one 90 ft. continuous I-beam spans Sta. 166 plus 46 over Bonne Femme Creek, Route 40 from Boonville east, Proj. F 235 (9) a-A, Howard Co., all foregoing over $50,000 each; two 12 ft. rein.-con. slab spans Sta. 3 plus 67 over Eleven Point R, Route SU from Route 600 southerly to Route SN, Proj. S263 (1)-A, Howell Co.; exten. two 12 ft. rein.-con. slab spans Sta. 7 plus 45 over creek, Route 52- from Clinton to Calhoun, Proj. F 333 (2)-A, Henry Co.; one 50 ft., three 45 ft. rein.-con. deck girder spans Sta. 97 plus 95 over Little Platte River, Route SH from Route 33 east to Route SA at Turney, Proj. S-196 (1), Clinton Co.; widening 18 ft. concrete slab spans Sta. 378 plus 73 over Spiva Bridge Route 67 from Fredericktown south, Sect. 2, Madison Co., all foregoing under $50,000 each. C. W. Brown, Jefferson City, ch. engr.

Bids Asked July 13

N. Y., New York—Dpt. P. Wks., Municipal Bldg., Zone 7, Contr. 1, substructures, and approach ramps, south unit, for Unionport Bridge over Westchester Creek at Bruckner Blvd., Bronx Boro. Plans deposit $25.

LOW BIDDERS

New Hampshire—State Hy. Dpt., Concord, June 10, 62 ft. rein.-con. slab bridge, approaches, Gilsum, Proj. No. S-271 (2), from W. W. Wyman, Inc., Shelburne Falls, Mass. **$70,337.** CD 6/4.

West Virginia—State Hy. Comn., Charleston, rejected bids May 18, substructure, Reader Bridge, Logan Co. LB. **$36,433.** CD 5/6—ENR 5/13.

Wisconsin—State Hy. Comn., Madison, rejected bids June 8, 0.13 mi. Tramway Bridge approaches. LB. **$161,651.** CD 6/14—ENR 6/17, under LB.

†**Wyoming**—U. S. Forest Service, Post Office Bldg., Denver, Colo., received no bids June 8, North Tongue Bridge and Burgess T.T. 201, Sheridan Co.; Shell Creek Bridge and approaches on Paint-rock T.T. 207, Big Horn Co., Big Horn Natl. Forest. $52,000. CD 5/28.

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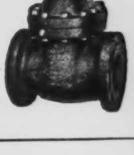

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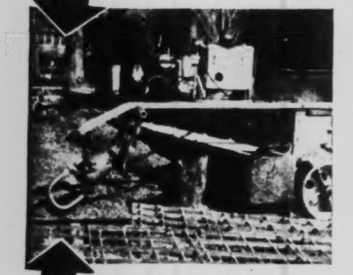
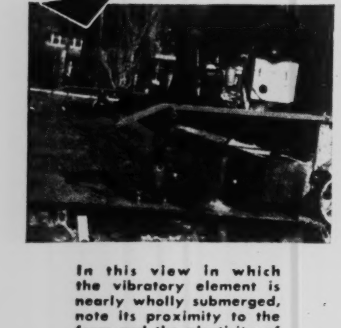


Vibrators in the raised position. Note the rounded character of the loop which enables it to get up close to the side forms. Loops may be inexpensively replaced when wear finally occurs.



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BRIDGES (Cont'd.)

CONTRACTS AWARDED

New Jersey — State Hy. Comn., Trenton, bridge, Union Co., to Villa Contg. Co., 1015 Central Ave., Westfield. **$845,999.** Bids 6/1, awarded 6/9. CD 6/3—ENR 6/10.

●**New Jersey** — State Hy. Dpt., Trenton, bridges, approaches at Oak Tree Rd., New Dover Rd., Inman Ave., Woodbridge Twp., Middlesex Co., to Union Building & Constr. Corp., 631 Main Ave., Passaic. **$1,498,911.** Bids 4/29. CD 5/3—ENR 5/6.

New Jersey—State Hy. Dpt., Trenton, 3 bridges, Passaic Co., to Franklin Contg. Co., 12 Central Ave., Newark. **$524,054.** Bids 5/20. CD 5/25—ENR 5/27.

West Virginia—State Hy. Comn., Charleston, imprv. 0.928 mi. Elm Grove Bridge approaches, Ohio Co., to Atlas Eng. Co., Fidelity Bldg., Wheeling. **$207,497.** Bids 5/18. CD 5/6—ENR 5/13.

STREETS AND ROADS

BIDS ASKED

Bids Asked June 29

●**Virginia**—State Hy. Dpt., Richmond, retreatment work along 625 mi. highways; furnishing, applying 1,827,324 gal. bituminous material, 99,282 tons crushed stone and gravel, 288,904 gal. bituminous materials. $6,500,000.

Bids Asked About July 1

O., Toledo—City, paving, curbing, draining Ironwood, Girard, Carlyle, Emerson, White, Crystel and Myrtle Sts. $130,000. Arnold Finch, city engr.

Bids Asked July 2

Kentucky — State Hys. Dpt., Frankfort, Class F mix, 1,322 tons, 1.584 mi. Hopkinsville-Madisonville Rd., from south corporate limit of Crofton, Proj. SP 24-5, 1,696 tons, 3.059 mi. Hopkinsville-Pembroke-Guthrie Rd., from west corporate limits of Pembroke to Todd Co. line, Proj. SP 24-85, Class F mix, 845 tons, rock asphalt, 338 tons, 0.481 mi. Hopkinsville-Pembroke-Guthrie (East 9 St.), from east curb of Main St., Hopkinsville to concrete pavement, Projs. SP 24-85, Class F mix, 673 tons, 0.575 mi. Hopkinsville-Clarksville (Walnut St.) Rd., from south curb 9 St., Hopkinsville to concrete pavement, Proj. SP 24-125, all foregoing in Christian Co., SP Group 25 (1948); rock asphalt, 373 tons, 6.841 mi. Russellville-Central City Rd., from junction Ky. 106 Lewisburg to Muhlenberg Co. line, Proj. MP 71-1-E, Logan Co.; 1,018 tons, 18.547 mi. Central City-Russellville Rd., from junction U. S. 62 east corporate limit of Central City to Logan Co. line, Projs. MP 89-2023-K, 89-23-P, 89-23-L, Muhlenberg Co., MP Group 26 (1948); Class C-1 mix, 3,088 tons, 5.573 mi. Sturgis-Shawneetown Rd., from 5 and Johnson Sts., in Sturgis to 1.5 mi. south of Spur to Henshaw, Proj. SP 113-227.

5,131 tons, 6.17 mi. Sturgis-Shawneetown Rd., from 1.5 mi. south of Spur to Henshaw, junction Ky. 56, Proj. SP 113-227, both Uinon Co., SP Group 27 (1948); Class I mix, 1,701 tons, 1.3 mi. Elizabeth-Munfordville Rd., from 7.264 mi. south of Elizabethtown to 0.3 mi. north of Nolin River Bridge, Proj. SP 47-119, 1,331 tons, 1.6 mi. Munfordville-Elizabethtown Rd., from 1.5 mi. north of Bacon Creek Bridge to 1.6 mi. Larue Co. line, Proj. SP 50-20, 2,910 tons, 3.5 mi. Munfordville-Elizabethtown Rd., from 2.135 mi. north of Munfordville, 2 mi. south of Bacon Creek Bridge, Proj. SP 50-20, 854 tons, 0.18 mi. Elizabethtown-Leitchfield Rd., from 2.7 mi. west of Elizabethtown to 950 ft. west, Proj. RP 47-199, 2,624 tons, 0.25 mi. Hy. Equipment garage near Elizabethtown, driveways, etc., Dist. garage 10, all foregoing in Hardin Co., SP Group 28 (1948); Class F mix, 9,837 tons, 8.501 mi. Edmonton-Tompkinsville Rd., from junction Ky. 80 in Edmonton to junction Ky. 90 near Beaumont, Proj. SP 85-44, 3,983 tons, 3.450 mi. Edmonton-Tompkinsville Rd., from junction Ky. 90 near Beaumont to Monroe Co. line, SP 85-44, both Metcalf Co.

9,775 tons, 10.291 mi. Tompkinsville-Edmonton Rd., from junction Ky. 63 in Tompkinsville to Metcalf Co. line, SP 86-14, Monroe Co., all foregoing SP Group 29 (1948); Class F, 545 tons, Lawrenceburg-Versailles Rd., 0.655 mi., SP 3-71, Anderson Co.; 5,262 tons, 3.223 mi. Versailles-Lawrenceburg Rd., from 3.123 mi. west of city limit of Versailles to Tyrone Bridge, SP 120-135, Woodford Co., both SP Group 30 (1948); 246 tons, 0.757 mi. Florence-Warsaw Rd., from U. S. 25 at Florence to intersection U. S. 25 and U. S. 42, SP 8-90, 9,537 tons, 15.101 mi. Florence-Warsaw Rd., from southwest corporate limit of Florence to Gallatin Co. line, SP 8-90, both Boone Co.; 8,318 tons, 17.185 mi. Warsaw-Florence-Carrollton Rd., from Boone Co. line to Carroll Co. line, SP 39-12 and SP 39-93, Gallatin Co., all foregoing SP Group 31 (1948); 757 tons, 0.529 mi. Danville-Stanford Rd., from Main St. and Wilderness Rd. intersection southeast, SP 11-120, 5,676 tons, 4.24 mi. Danville-Stanford Rd., from south corporate limit of Danville to Lincoln Co. line, SP 11-140, both Boyle Co., 5,369 tons,, 3.681 mi. Harrodsburg-Lawrenceburg Rd. north, SP 84-12.

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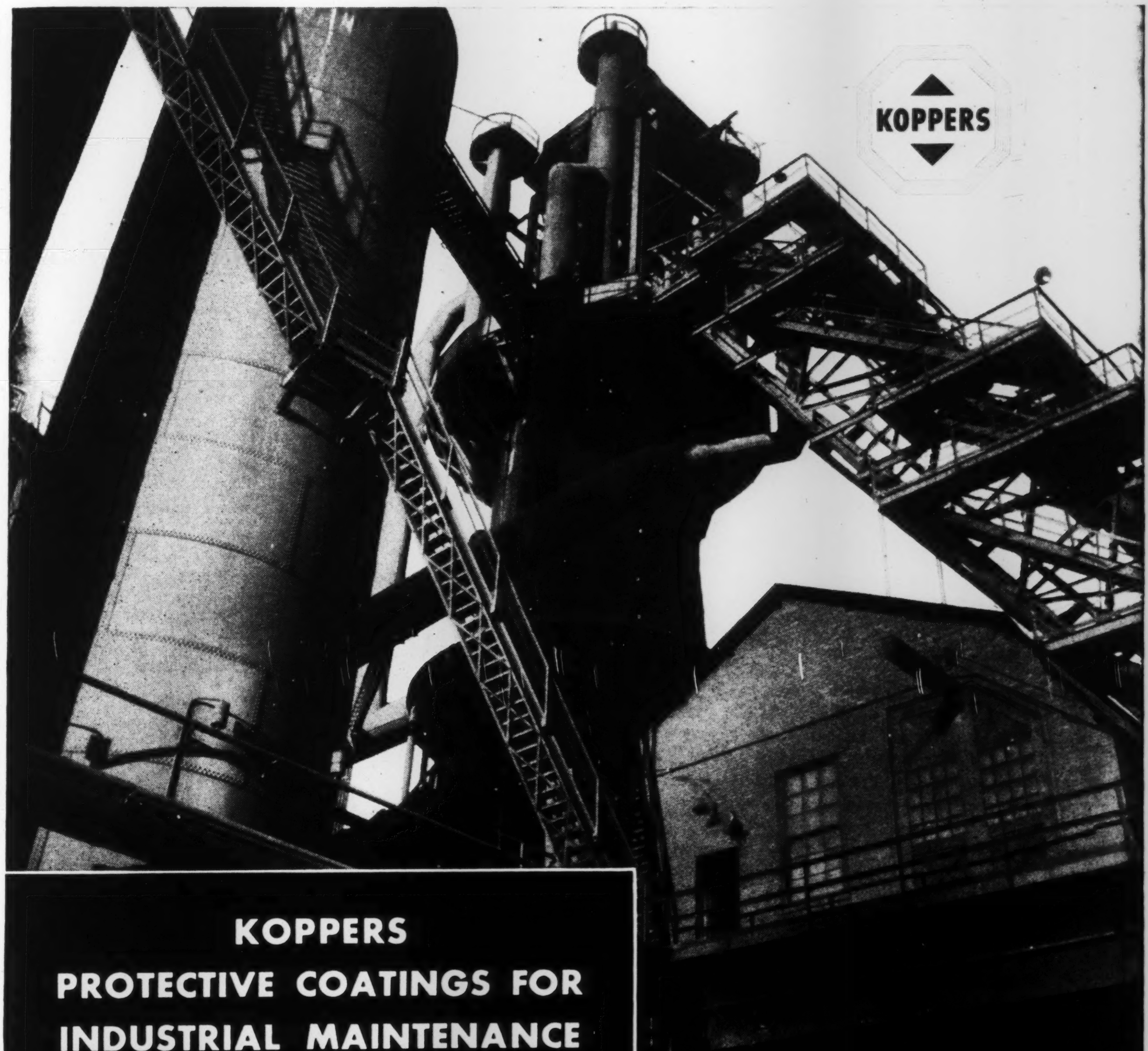

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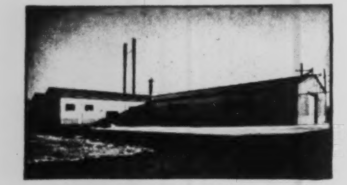

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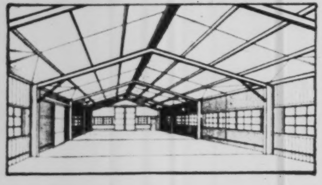

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STREETS, ETC. (Bids Asked, Cont'd.)

5,210 tons, 3.642 mi. Harrodsburg-Danville Rd. south, SP 84-112, Class F mix, 4,600 tons, 5.188 mi. Shakertown-Danville Rd., from U. S. 68 at Shakertown to Ky. 152 at north corporate limit of Burgin, SP 84-52, all foregoing in Mercer Co., SP Group 32 (1948); 6,866 tons, 8.725 mi. Somerset-Russell Springs Rd., from east end of Southern R. R. overhead to 0.25 mi. east of Nancy, SP 100-235, Pulaski Co., SP Group 33 (1948); Class A-2 seal, 900 tons, 6.25 mi. Albany-Columbia Rd., from intersection Burkesville-Ida Rd. to Desda, Proj. [illegible]26-B, Clinton Co., 1,705 tons, 11.742 mi. Parkers Lake-Cumberland Falls Rd., from U. S. 27 at Parkers Lakes to near Cumberland Falls Hotel, Proj. M-74-33-D, McCreary Co., MP Group 34 (1948); Class C-1 mix, 11,045 tons, 13.107 mi. Grayson-Fullerton Rd., from U. S. 60, northwest, SP 22-8 and 22-208, Class A-2 seal and C-1 mix, 481 tons and 66 tons, 4.347 mi. Gesling-Fullerton Rd., from Greenup Co. line near Keho Post Office to junction with Grayson-Carter City Rd., Proj. MP 22-228-B, both Carter Co., 1,322 tons and 2,320 tons, 20.926 mi. Fullerton-Olive Hill Rd., from 5.048 mi. south of Fullerton to Carter Co. line, MP 45-171-J, 45-171-K, 45-171-L, Greenup Co., all foregoing SP-MP Group 35 (1948).

Class C-1, 4,002 tons, Flemingsburg-Owingsville Rd., from junction Ky. 32 southeast of Flemingsburg to south of Ky. 158 at Hillsboro, SP 35-110, 537 tons, Flemingsburg-Vanceburg Rd., from ½ mi. northeast of Mt. Carmel to end of bridge at Lewis Co. line, SP 35-50.

4,863 tons, 7.489 mi. Flemingsburg-Vanceburg Rd., from east corporate limit of Flemingsburg, ½ mi. northeast of Mt. Carmel, SP 35-50, all foregoing in Fleming Co., 3,368 tons, 5.179 mi. Tollesboro-Mt. Carmel Rd., from Tollesboro to south end of bridge at Lewis Co. line, SP 68-94, Lewis Co., Class C-2 mix, 980 tons, Maysville-Parish Rd. north, SP 81-175, Class C-1 mix, 2,037 tons, 4.9 mi. Mayslick Rd., MP 81-255-B, 0.45 mi. Maysville-Parish Rd. north of junction U. S. 62 and U. S. 68, SP 81-175, 386 tons, 0.5 mi. Maysville-Brooksville Rd., from 2.7 mi. west of west corporate limits of Maysville to 3.2 mi. west, SP 81-215, all foregoing Mason Co., SP Group 36 (1948); Class F mix, 13,200 tons, 16 mi. Shelby-Millard-Nigh-Virginia State line Rd., from Grapevine to Virginia State line, SP 98-183, Pike Co., SP Group 37 (1948).

Class C-1 mix, 12,298 tons, 16.231 mi. Hopkinsville-Kirkmansville Rd., from U. S. 68 near east corporate limit of Hopkinsville to Todd Co. line, SP 24-45-F, Christian Co., SP Group 38 (1948); Class F mix, 7,505 tons, 9.025 mi. Edmonton-Glasgow Rd., from Ky. 163 in Edmonton to Barren Co. line, SP 85-84, Metcalf Co., 7,675 tons, 9.225 mi. Glasgow-Edmonton Rd., from east corporate limit of Glasgow to Metcalf Co. line, SP 5-52, 8,214 tons, 8.915 mi. Glasgow Cave City Rd., from intersection 31W at city limit of Glasgow to junction 31W, SP 5-212, both Barren Co., SP Group 39 (1948); Class C-1 mix, 4,250 tons, 9.582 mi. Index-Hazel Green Rd., from Cannel City to U. S. 460 at Index, MP 88-98-G, Morgan Co., SP Group 40 (1948); Class F mix, 11,739 tons, 12.178 mi. Pineville-Manchester Rd., from east corporate limit of Pineville to Crockett, Proj. SP 7-24, Bell Co., Class C-1 mix, 2,823 tons, 5 mi. Wallins-Twila Rd., from U. S. 119 near Wallins, SP 48-148, Harlan Co., SP Group 41 (1948).

Minnesota—State Hy. Dpt., St. Paul, grading, paving 4.2 mi. between 1.2 mi. northwest of Osseo and 2½ mi. south of Osseo, SP 27-43-04 (T.H. 152-129), SP 2721-03 (T.H. 52-3) and SP 2721-04 (T.H. 52-3), F.I. 528 (1) and F.I. 449 (8). Plans deposit $2.30; gravel base and plant mix bituminous surface 9.5 mi. between Hampton and 1½ mi. north of Coates SP 1906-07 (T.H. 52-116), F 914 (4). Plans deposit 70c.; 5.8 mi. between T.H. 55 at Mendota to South St. Paul, SP 1918-25 (T.H. 100-117). Plans deposit 60c.; grading, gravel subbase and bituminous stabilized base 14.6 mi. between 0.3 mi. south of North Washington Co. line and North Branch, SP 8207-15 (T.H. 61-1), SP 1302-03 (T.H. 61-1), SP 1303-04 (T.H. 61-1) and SP 1303-03 (T.H. 61-1), F.I. 322 (2) and F.I. 2 (2). Plans deposit $3; grading, crushed rock base and wearing surface, incl. Bridge 6679, 3.5 mi. between 0.8 mi. west of Houston to Cedar and Grant St., Houston on T.H. 16 and on T.H. 76 between 1 mi. and 2.9 mi. south of junction T.H. 16 near Houston, SP 2801-14 (T.H. 16-9) SP 2807-02 (T.H. 76-76) and SP 2807-03 (T.H. 76-76), F 289 (2), S 46 (1) and S 46 (2). Plans deposit $3.55

Grading, concrete box culvert 7.5 mi. between junction T.H. 119 and Milan, SP 3701-06 (T.H. 40-145) and SP 1209-05 (T.H. 40-145), S 11 (2). Plans deposit $2.30; shoulder grading, gravel subbase 10.4 mi. between Calumet and Keewatin, SP 3116-15 (T.H. 169-35), F 455 (23). Plans deposit $1.50; grading, gravel base and subbase and road-mixed bituminous surface 11.9 mi. between Beroun and Friesland, SP 5805-07 (T.H. 61-1), SP 5806-05 (T.H. 61-1) and SP 5806-06 (T.H. 61-1), F.I. 1 (4). Plans deposit $2.60; grading, gravel base, concrete base, plant mix bituminous surfacing 8 mi. incl. concrete box culverts and Bridge 6696 in Farmington between Division St. and East Corp. Limits between Farmington and Rosemount, SP 1914-02 (T.H. 65-50), SP 1920-63 (T.H. 218-1), SP 1921-08 (T.H. 218-1), SP 1921-16 (T.H. 218-1) and SP 1921-17 (T.H. 218-1) and SP 1921-17

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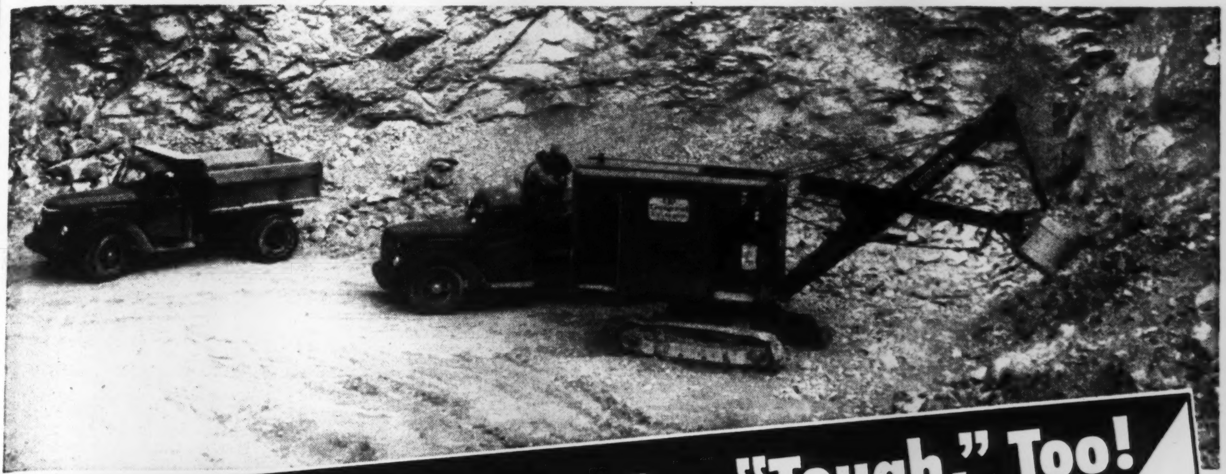
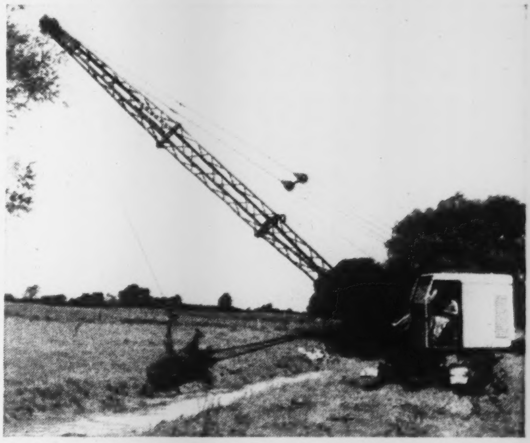


The New *Generals* Are "Tough," Too!



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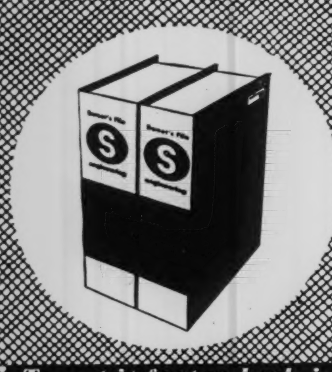

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STREETS, ETC. (Bids Asked, Cont'd.)

(T.H. 218-1), F 306 (3), F 212 (7) and F 212 (3). Plans deposit $5; soil stabilized gravel base, roadmixed bituminous surface and plant mixed bituminous surface 13.2 mi. between Randall and 2½ mi. north of Lincoln, SP 4903-09 (T.H. 10-37), F 376 (7). Plans deposit 60c.; road-mixed bituminous surfacing 14.3 mi. between Ulen and T.H. 10, SP 1403-12 (T.H. 32-177). Over $50,000 each. O. L. Kipp, St. Paul, ch. engr.

Missouri — State Hy. Dpt., Jefferson City, graded earth and surfacing 2.528 mi. Route SH, from Grove Springs east towards Manes, Proj. S-482 (1)-A; 3.258 mi. Route SH, from Grove Springs east towards Manes, Proj. S-482 (1)-B, both Wright Co.; 4.413 mi. Route SF, from Teresita southerly to Oregon Co., Proj. S-869 (1)-A; 4.223 mi. Route SF, from Teresita southerly to Oregon Co., Proj. 868 (1)-B, both Shannon Co.; 3.389 mi. Route SU, from Route 60 southerly to Route SU, Proj. S-263 (1)-A; 3.829 mi. Route SU, from Route 60 southerly to Route SN, Proj. S-263 (1), both Howell Co.; 1.311 mi. Route SH, from Taberville southerly to Route 82, Proj. S-675 (5)-A; 4.842 mi. Route SH, from Taberville southerly to Route 82, Proj. S-675 (4)-B, both St. Clair Co.

3.98 mi. Route SH, from Bosworth north to Hale, Proj. S-312 (1)-A; 2.285 mi. Route SH, from Bosworth to Hale, Proj. S-312 (1)-B, both Carroll Co.; 2.102 mi. Route SJ, from Randolph Co. line east to Duncans Bridge, Proj. S-577 (3)-A; 4.968 mi. Route SV, from Route 24 (Stoutsville) to Shelby Co., Proj. S-162 (3), both Monroe Co.; 3.804 mi. Route SC, from Belgarde northwest, Proj. S-454 (2), Washington Co.; 4.923 mi. Route SE, from Route C southeast to Route 25 (Perryville), Proj. S-250 (1), Perry Co.; 4.406 mi. Route SH, from Route 33 east to Route SA at Lurney, Proj. S-196 (1), Clinton Co.; graded earth, widening, stabilized aggregate base 0.169 mi. Route 67, Sect. 2, from Frederickstown south, Madison Co.; graded earth, gravel 3.475 mi. Route SE, from Potosi to Sullivan, Proj. S-846 (5)-A, Washington Co.; 1.947 mi. Route SD, from Potosi to Sullivan, Proj. S-846 (5)-B, Washington Co., all foregoing each under $50,000 each.

Graded earth, 10 ft. concrete paving 2.924 mi. Route 52, from Clinton to Calhoun, Proj. F-333 (2)-C; 10 ft. concrete paving 3.787 mi. Route 52, from Clinton to Calhoun, Proj. F-333 (2)-B; 10 and 22 ft. concrete paving 3.78 mi. Route 52, from Clinton to Calhoun, Proj. F-333 (2)-A; 4.541 mi. Route 52, from Windsor to Calhoun, Proj. FA 133-A (6), all foregoing in Henry Co.; 22 ft. concrete paving 1.546 mi. Route 74, from Route 61 northeast to Spring St., Proj. U-52 (3), Cape Girardeau Co.; graded earth pavement widening 4.229 mi. Route 40, from Boonville east, Proj. F-235 (9)-A-B; graded earth 24 ft. concrete pavement widening Route 40 Boonville east, Proj. F-235 (90)-a-A, both Howard Co., all foregoing over $50,000 each. C. W. Brown, Jefferson City, ch. engr.

Bids Asked July 6

Minn., Gaylord—Sibley Co., W. C. Oldenburg, aud., Gaylord, grading, graveling 4.4 mi. between ½ mi. north of south co. line and 1.5 mi. south of Trunk Hy. 19, east of Winthrop, S.P. 72-508-01 (SAR 4), Minn., Proj. S-372 (1). $50,000. Plans deposit $2. O. L. Kipp, St. Paul, ch. engr.

Bids Asked July 7

Minn., Blue Earth—Faribault Co., G. G. Buscho, aud., Blue Earth, grading, gravel surfacing 3 mi. State Aid Rd. 13, Co. Proj. 4805, Plan No. 2225; bituminous stabilized base and bituminous surface 5.5 mi. State Aid Rd. No. 5, between southwest corner Sect. 10, T 102 N, R 25 W, Co. Proj. 4809, Plan No. 2229. Over 50,000. Plans deposit $5 each. A. G. Wrucke, co. engr.

LOW BIDDERS

Ariz., Phoenix—City, grading, draining, bituminous plant mix surfacing parts 4 streets, from Daley Constr.—Acme Materials Co., 2400 S. 16 St. **$79,711.** CD 2/1/46—ENR 2/21/46.

●**Illinois** — State Hy. Dpt., Springfield, rejected bids May 28, imprv. 5.63 mi. Bond Co., L.B. **$154,426*****5.29 mi. Brown Co., L.B. **$243,549*****5.02 mi. Effingham Co., **$171,117** ***9.83 mi. Ford Co., L.B. **$219,463*****1.67 mi. Henderson Co., L.B. **$106,368*****7.56 mi. Lake Co., L.B. **$383,879*****1.14 mi. Peoria Co., L.B. **$468,491*****2.46 mi. and 2 bridges Williamson Co., L.B. **$311,952*****1.69 mi. Cook Co., **$416,779*****2.09 mi. Menard Co., L. B. **$228,974.** CD 6/3—ENR 6/10, under LB.

West Virginia—State Hy. Dpt., Charleston, rejected bids May 18, imprv. 7.618 mi. Wood Co. L.B. **$204,147.** CD 5/6—ENR 5/13.

Wisconsin—State Hy. Comn., Madison, rejected bids June 8, imprv. 4.957 mi. Ashland Co. L.B. **$155,080.** CD 6/14—ENR 6/17, under LB.

CONTRACTS AWARDED

Kansas—State Hy. Dpt., Troy, to M. W. Watson, National Bank of Topeka, Topeka, imprv. 0.369 mi. Brown Co., **$77.906,** 0.605 mi. Pottawatomie Co., **$108,905,** 7.074 mi. Doniphan Co., **$92,965;** to F. F. Marbut, Emporia, 2.672 mi. Doniphan Co., **$61,160.** Grand total $340,936. Bids 6/4. CD 5/20—ENR 5/27.

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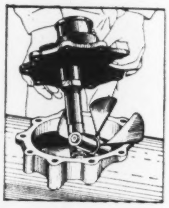

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- General Electric Co.
- General Motors Proving Ground Milford, Mich.
- Industrial Rayon Corp.
- Jack & Heintz Precision Industries
- Jones & Laughlin Steel Corp.
- Linderme Tube Co.
- Midland Steel Products Co.
- National Screw & Mfg. Co.
- National Tube Division United States Steel Corp. Lorain, Ohio
- New Departure Division Genera Motors Corp., Sandusky, Ohio
- New York Central System
- Nickle Plate Railroad
- Ohio Crankshaft Co.
- Ohio Bell Telephone Co.
- Ohio Gear Co.
- Ohio Rubber Co.
- Republic Steel Corp.
- Ridge Tool Co., Elyria, Ohio
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STREETS, ETC. (Contracts Awarded, Cont'd.)

Kansas—State Hy. Comn., Osborne, imprv. 11.024 mi. Osborne Co., and 8.127 mi. Phillips Co., to D. G. Hansen, Logan. **$241,644** and **$127,614** respectively. Bids 5/28. CD 5/14—ENR 5/20.

New Jersey—State Hy. Dpt., Trenton, imprv. 1.6 mi. Passaic Co., to Union Building & Constr. Corp., 631 Main Ave., Passaic. **$958,979.** Bids 5/20. CD 5/25—ENR 5/27, under LB.

Okla., Norman — City, grading, drainage concrete paving 19 blocks in Brookside addn., to Amis Constr. Co., 1647 Exchange St., Oklahoma City, **$124,136.** Est. $127,000. E. H. Durkee, Norman, engr.

Tex., Beaumont—Jefferson Co., Beaumont 9½ mi. 18 ft. all-weather road, flexible base, no surface and gravel base and asphalt topping, League Rd. northwest of Hampshire, to Trotti & Thompson, Beaumont. **$89,968.** Bids 6/9. CD 6/2.

Tex., San Antonio—H. B. Zachry Co., Transit Tower, asphalt type street paving, north of Terrell Hills, force account. **$70,000.**

West Virginia—State Hy. Comn., Charleston, imprv. 18.7 mi. Lincoln Co., to Anderson's, Inc., Charleston, **$68,317;** 20 mi. Mingo Co., to Standard Asphalt & Tar Co., Charleston, **$74,666.** CD 5/26—ENR 6/3.

West Virginia—State Hy. Comn., Charleston, imprv. 8.46 mi. Proj. 216A and 9.5 mi. Proj. 68, 96 and 3181A, B, C and D, Nicholas Co., to Sam Finley, Inc., 2024 Franklin Rd., Roanoke, Va., **$60,489,** and **$100,870** respectively; 13.87 mi. Harrison Co., to Feather Constr. Co., Morgantown, **$53,453.** Grand total $214,812. CD 5/6—ENR 5/13.

Alta., Calgary—Municipality, grading, graveling 6½ mi. roads, day labor. **$52,097.** J. R. Wood, Calgary, engr. CD 10/7/43—ENR 10/14/43.

N. B., St. Stephen—Municipality, paving, to Coastal Asphalt Products, Ltd., Rohesay Ave., Saint John. About **$90,000.** Bids 3/15. CD 3/5.

Ont., Toronto — City, H. E. McCallum, mayor, asphaltic concrete paving Dufferin St. to Bloor St., to Godson Contg. Co., Ltd., 203 Richmond St., about **$57,370*****Clifton Rd. exten. from Whitehall Rd. to Inglewood Dr., to Rayner Constr. Ltd., 29 Commercial Rd., Leaside, about **$51,699*****Dufferin St. from College St. to point 550 ft. north of Sylvan Ave., to George W. Porter Constr. Co., Ltd., Lawrence Ave. W. About **$59,191.** Grand total $168,260. CD 10/20—ENR 10/30.

EARTHWORK, WATERWAYS

BIDS ASKED

Bids Asked July 2

†Wyoming—Bureau Reclamation, Dpt. Interior, Kortes Dam, clearing, Kortes Reservoir Site, Kortes Unit, along North Platte River between Kortes Dam and Seminoe Dam, Carbon Co., Missouri Basin Proj. Spec. 2285.

Bids Asked July 7

†Illinois—U. S. Eng., 520 Merchandise Mart, Chicago, Zone 54, constructing, enlarging levees in Lacey, Langellier, West Matanzas and Kerton Valley Drainage and Levee Dist., Fulton Co., Serial No. Eng.-11-032-48-144. Extended date. CD 5/24—ENR 5/27.

†Texas—U. S. Eng., 606 Santa Fe Bldg., Galveston, dredging, Port Aransas-Corpus Christi Waterway from Avery Point Turning Basin to vicinity Tule Lake Basin in Nueces Bay, approx, 2,140,000 cu. yd. materials, Inv. No. Eng.-41-243-48-377. Est. $150,000.

Bids Asked July 8

†D. C., Wash.—U. S. Eng., First and Douglas Sts. N. W., Zone 25, reconditioning Anacostia Levee, Flood Control Proj., Spec. Eng.-49-080-128-(45)C. CD 6/17/43—ENR 7/1/43.

Bids Asked about July 22

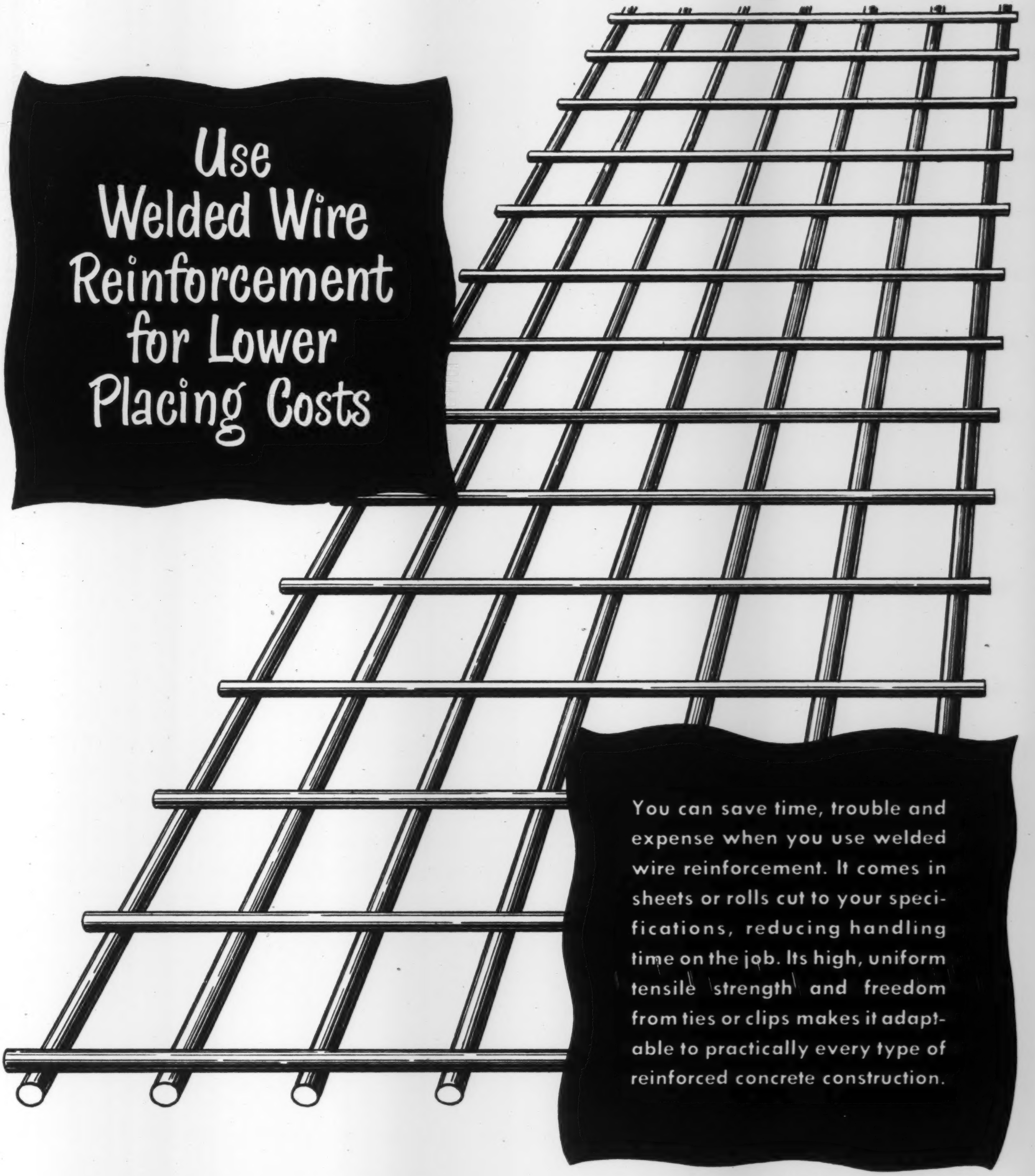
†Oregon—U. S. Eng., 628 Pittock Block, Portland, Zone 5, major portion navigation lock, abutment, embankment, fishways, portion spillway dam, other appurtenant structures on section McNary Dam adjacent to north shore of Columbia River, Serial No. Eng.-35-026-48-800. Extended date. CD 4/21—ENR 4/29.

LOW BIDDERS

●Florida—U. S. Eng., P. O. Box, 4970, Jacksonville, June 11, dredging approx. 3,540,000 cu. yd. materials from St. Lucie Canal between Lake Okeechobee and a new lock 8 mi. west of Stuart, St. Lucie Co., a distance of 24 mi. to discharge flood waters, and enlarge, deepen canal for navigation, from The Hendry Corp., Rattlesnake. **$1,276,000.** CD 5/18—ENR 5/20.

†Indiana—U. S. Eng., 830 W. Broadway, Louisville, Ky., June 8, inverted U type tunnel approx. 118 sq. ft. cross section, approx. 400 ft. long, Cagles Mill Reservoir, near Greencastle, from Kenny Constr. Co., 111 W. Washington St., Chicago, Ill., **$377,085.** Est. $306,055. CD 5/12—ENR 5/20.

†Louisiana—U. S. Eng., foot of Prytania St., New Orleans, June 5, clearing, snagging



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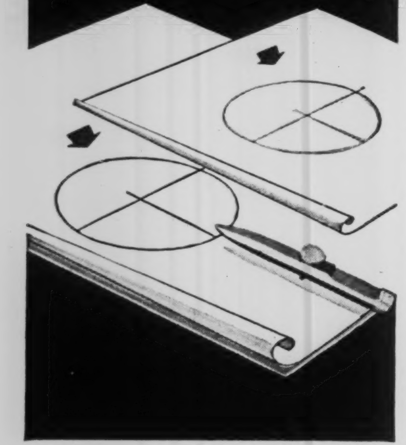

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approx. 29 mi. channel, incl. removing 2 bridges, Serial No. Eng.-16-047-48-413, Grant and Rapides Parishes, from Amite Sand & Gravel Co., 1445 Florida St., and from J. B. Brock, Jr., Lafayette. **$138,672** each.

CONTRACTS AWARDED

Ill., East St. Louis—East Side Levee & Sanitary Dist., Bd. Trustees, Dan Foley, pres., 628 A Missouri Ave., outlet drainage channel discharging into Horseshoe Lake from area embraced with Nameoki and environs, Madison Co., etc. Proj. 15, to Keeley Bros Contg. Co., 4211 State St., **$429,143.** Est. over $300,000. Bids 5/21—CD 4/19—ENR 4/22.

AIRPORTS AND AIRBASES

BIDS ASKED

Bids Asked July 6

Minn., New Ulm—AIRPORT IMPRVS.—City, A. C. Sannwald, clk., grading, drainage, graveling, landing strip markers, etc. at municipal airport. $100,000. Plans deposit $5. E. E. Hogeland, Sleepy Eye, engr. CD 9/18—ENR 10/2.

Bids Asked On Or About July 8

†Kan., Salina—SWIMMING POOL, etc.—U. S. Eng., 1709 Jackson St., Omaha, Neb., 70 x 80 ft., concrete swimming pool, 39 x 68 ft. bathhouse, lighting, utilities, etc. for Smoky Hill Air Force Base, Spec. No. 25-066-48-597.

Bids Asked July 8

Tex., Luling — AIRPORT — City, John Bigance, mayor, Memorial Airport. $50,000. Plans deposit $20. Wm. Orrison Engineers, 705 Travis Bldg., San Antonio, engrs.

Bids Asked About July 15

Tenn., Memphis—RUNWAYS—City, exten. 2 runways, 3 new taxiways, etc., at Municipal Airport. $400,000. Frank A. Busse, 669-670 Shrine Bldg., engr. CD 1/27/47—ENR 2/6/47.

LOW BIDDERS

†Ia., Des Moines—PARKING APRONS—U. S. Eng., 1709 Jackson St., Omaha 2, Neb., June 10, aircraft parking apron at municipal airport, Serial No. 25-066-48-518, from James J. Parks Co., 27 and Ed. Creighton Ave. **$227,637.** Est. $178,760. CD 6/3.

●N. Y., Idlewild—AIRPORT—Port of New York Auth., 111 Eighth Ave., New York, Zone 11, June 14, grading, drainage, paving apron taxiways for Runways D, E and F, Contr. NYA-9, from Frank Mascali & Sons, 4634 Third Ave., New York, Zone 57, **$1,390,720;** conduit and manhole sys. for Runway V lighting, Contr. NYA-12B, from Lord Electric Co., 10 Rockefeller Plaza., New York, Zone 20, **$119,000.** CD 5/28—ENR 6/3.

N. Y., Jackson Heights—DIKE, etc.—Port of New York Auth., 111 Eighth Ave., New York, Zone 11, rejected bids June 8, marginal dike and drainage ditch at La Guardia Airport, Contr. LGA-3. CD 5/28—ENR 6/3.

Pa., Pittsburgh — AIRPORT — Comrs. Allegheny Co., Dpt. Aviation, County Office Bldg., pavement, curb and sidewalks, loading apron area, Greater Pittsburgh Airport, Moon Twp., near here, from Dinardo, Inc., 333 Boquet St. **$299,583.** Est. $350,000. CD 1/30/46—ENR 2/21/46.

LATIN AMERICA

Venezuela—State of Carabobo, road between Montalban and Paso Real, own forces. **$250,000.**

Venezuela—State of Lara, with Dpt. P. Wks., reconstructing road between Taborda and Barquisimeto, **$250,000;** paving Taborda-Barquisimeto Hy. **$150,000,** near Barquisimeto, own forces.

Venezuela—State of Trujillo, Conj. Pub. Wks. Ministry, repairs, new construction state state highways, own forces. **$125,00.**

Venezuela, Barcelona—Pub. Wks., Dr. E. Pardo Stolk, minister, Caracas, temporary housing for victims of rio Araguita floods, own forces. **$400,000.** CD 5/6/46—ENR 5/9/46.

Venezuela, Caracas—Workers Bank, Caracas, 4 story apartment Los Rosales Dist., to Constructora Velman (Velutini & Manrique), Sur 19 El Conde Dist., Caracas. **$400,000.**

Venezuela, El Tinaco—State of Carabobo, Conj. Pub. Wks. Ministry, constructing asphalt road, Tocuyito, near El Tinaco, own forces. **$400,000.**

Venezuela, Maracaibo — City, Luis Vera, pres. City Council, water, highways, sewerage, own forces. **$2,000,000.** CD 3/5/46—ENR 3/14/46, CD 9/25/46—ENR 10/17/46, CD 12/4—ENR 1/8 and CD 9/17—ENR 9/25.

Venezuela, Merida—Group of Agriculturists headed by Francisco Morillo, road between El Vigia and Santa Barbara in the state of Merida, own forces. **$100,000.**

Venezuela, San Carlos—State of Cojedes, road repairs, own forces. **$300,000.**

PUBLIC BUILDINGS

BIDS ASKED

Bids Asked June 29

Ala., Mobile—City, police bldg. Over $300,000. Extended date, Platt Roberts & Co., Government St., archts. CD 5/28—ENR 6/3.

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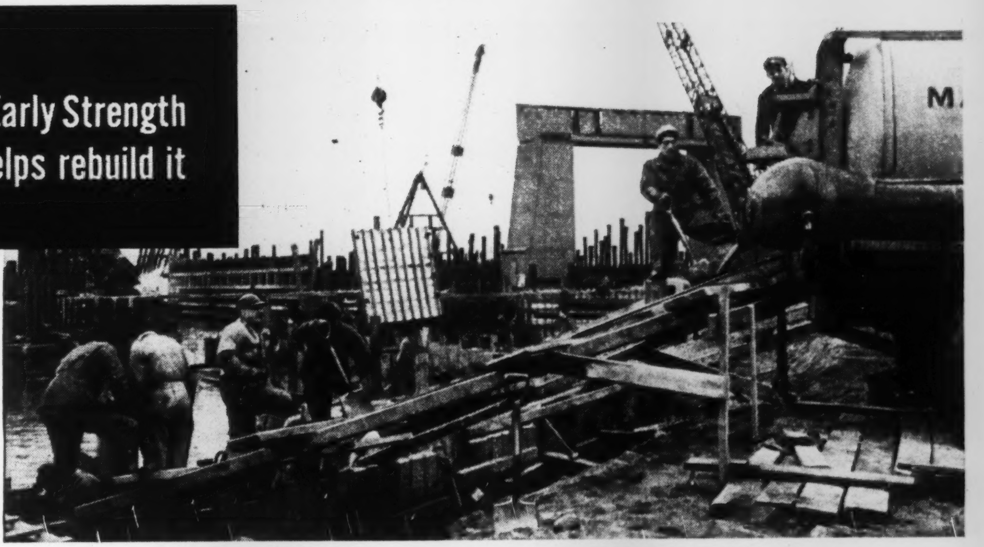

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Owner: City of New York, Dept. of Marine & Aviation, Pier "A", North River, N. Y.; Consulting Engineers: Madigan-Hyland, 2804 - 41st Ave., L. I. C., N. Y.; Contractor: J. Rich Steers Company, 17 Battery Place, N. Y. C.; Ready Mixed Concrete: Road Material Corp., Arthur Road, Eltingville, P. O. Greenwich, S. I., N. Y.

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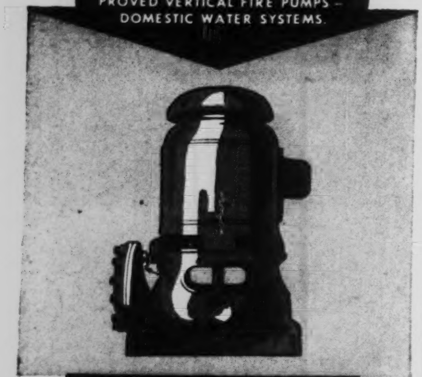

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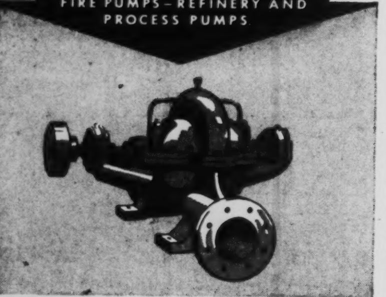

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PUBLIC BLDGS. (Bids Asked, Cont'd.)

Bids Asked June 30

Ga., La Grange—City and Troup Co., hospital addn. Shutze & Armistead, Candler Bldg., Atlanta, archts.

Tex., Carrizo Springs—Dimmit Co., 30 bed hospital. $301,000. Plans deposit $25. Joe G. Smyth, 1806 Alameda St., Corpus Christi, engr. CD 2/4—ENR 2/19.

Bids Asked July 2

†Ariz., Nogales—P. Bldgs. Admin., W. E. Reynolds, comr., Federal Works Agency Bldg., Wash., D. C., New Garita-Immigration Station, APPR. ECP-1937, Proj. 2-026 SA-AE. Plans deposit $5. **F. W. A.**

B. C., Burnaby—A. C. Durkin, secy. Burnaby School Bd., 2800 McKay Ave., 2 story, 64x136 ft. frame, stucco Junior High School. About $250,000. Plans deposit $25. E. Evans & Son and J. Cullerne, 325 Howe St., Vancouver, archts.

Bids Asked July 6

La., De Ridder—Parish School Bd., De Ridder, brick auditorium and 8 classroom De Ridder Grammar School addn. Barron & Heinberg, 512 Guaranty Bank Bldg., Alexandria, archts. Extended date. CD 6/2—ENR 6/10.

Minn., Virginia—St. Louis Co., F. W. Johnson, purch. agt., Courthouse, 3 story, bsmnt., 40x230 ft., rein.-con., infirmary. $750,000. Plans deposit $25. Damberg & Damberg, Virginia, archts. A. C. Wahlberg, 403 Providence Bldg., Duluth, engr. CD 6/2—ENR 6/10.

Bids Asked July 7

Wash., Seatlle—School Dist. 1, 810 Dexter Ave., 2 story, part bsmnt., 214x240 ft., rein.-con. administration bldg. $500,000. Plans deposit $25. J. L. Holmes, Old Times Bldg., Zone 1, archt. CD 6/23/47—ENR 7/10/47.

Bids Asked July 8

Wis., Shorewood—School Dist., 1701 E. Capitol Dr., Zone 11, 2 story, 76x145 ft., rein.-con., steel, stone, brick Lake Bluff School addn. $350,000. Eschweiler & Eschweiler, 720 E. Mason St., Milwaukee, Zone 2, archts. CD 11/12—ENR 11/27.

Bids Asked July 9

†California—Bureau Reclamation, Dpt. Interior, Redding, installing 3 main generators in Keswick Power Plant, Keswick Dam on Sacramento River, approx. 4 mi. northwest of Redding, Kennett Div., Central Valley Proj., Spec. 2279. Plans deposit $1. Walker R. Young, Bldg. 1-A, Denver Federal Center, Denver, Colo., ch. engr.

Bids Asked July 13

†Arizona-Nevada—Bureau Reclamation, Dpt. Interior, Bldg. 1-A, Denver Federal Center, Denver, Colo., furnishing, del. f.o.b. cars shipping point or f.o.b. cars at Kingman, (Louise), Ariz., fabricated substructural steel for structures in 230 kv. switchyard, and for take-off structure, stubs and anchor bolts for Davis Dam Powerplant, Davis Dam Project, Spec. 2295. Plans deposit $2. Walker R. Young, ch. engr.

†Idaho—Bureau Reclamation, Dpt. Interior, Lewiston, irrigation distr. sys. main pipe line, Sta. 0 plus 15 to Sta. 232 plus 30, Lewiston Orchards Proj., along Power Ave. from Reservoir A to Relief Reservoir 1, Lewiston Orchards, Spec. 2286.

Bids Asked July 15

†Mich., Sault Ste. Marie—U. S. Eng., 609 Federal Bldg., Detroit, Zone 31, hydro-electric power plant and appurtenant works at St. Marys Falls, St. Marys River, Serial No. Eng.-20-064-48-100. Readvertisement. CD 5/13—ENR 5/20.

Bids Asked July 20

†Montana — Bureau Reclamation, Dpt. Interior, Bldg. 1-A, Denver Federal Center, Denver, Colo., 7,500 kva. substation at Wolf Point, Fort Peck Proj., Spec. 2282.

†Nebraska — Bureau Reclamation, Dpt. Interior, Bldg. 1-A, Denver Federal Center, Denver, Colo., 10,000 kva. substation, approx. 1 mi. west of Alliance, Transmission Lines Unit, Nebraska, Missouri Basin Proj., Spec. 2283.

Bids Asked July 29

†Montana — Bureau Reclamation, Dpt. Interior, Bldg. 1-A, Denver Federal Center, Denver, Colo., 2,000 kva. substation at Savage, Fort Peck Proj., Spec. 2290.

Bids Asked

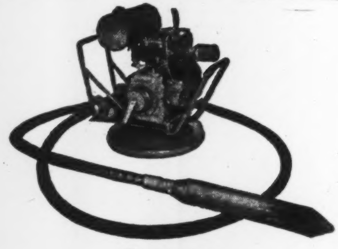
R. I., Warwick—City, Mayor R. P. Ruerat, City Hall, 1 story, 50 x 270 ft. and 50 x 70 ft., brick, cinder block garage-shop for Water and Hy. Dpts., Sandy Lane. $100,000. S. Wesley MacConnell, 20 Centerville Rd., Apponaug, archt.

LOW BIDDERS

●†La., Alexandria—Veterans Admin., Munitions Bldg., Wash. 25, D. C., June 8, addnl. bldgs., utilities for Veterans Hospital, Spec. 4815, from J. D. Hedin Constr. Co., 820 Michigan Ave. N.E., Wash. 17, D. C., **$4,602,000;** elevators, from Warsaw Elevator Co., Warsaw, N. Y., **$117,776.** CD 5/4—ENR 5/6.

N. Y., Albany—City, parking garage, from Cassidy & Gallagher, Inc., 11 S. Lake Ave., Albany. **$394,800.** CD 5/1/47—ENR 5/15/47.

N. Y., Flushing—Bd. Transportation, 250 Hudson St., New York, Zone 13, June 4, bldg. fdns. for Flushing bus garage, near Roosevelt Ave. between 1223 and 126 St., Queens, Contr.



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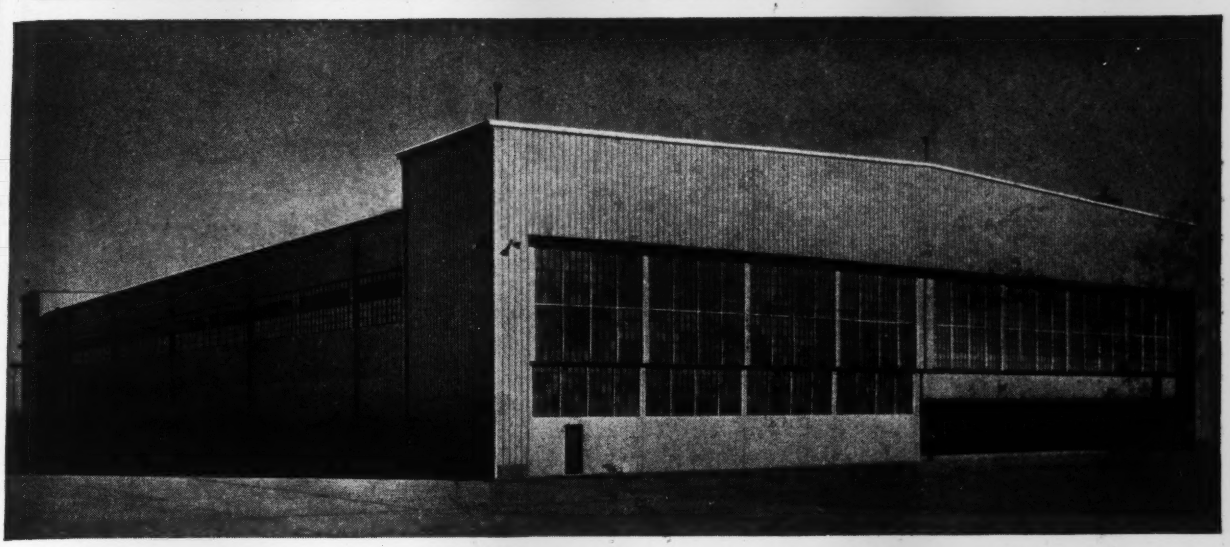

ABOVE. Truscon, world's largest manufacturer of steel building products, supplied the structural steel, Ferroplate Siding, Ferrobord Steeldeck Roof, Pivoted Steel Windows with Mechanical Operators, and electrically operated Vertical Lift Canopy Doors, for this Lockheed Hangar Building, MacArthur Field, Long Island, New York. Practically your entire steel building products needs can be supplied by Truscon—see SWEET'S Catalog, or write for complete literature.

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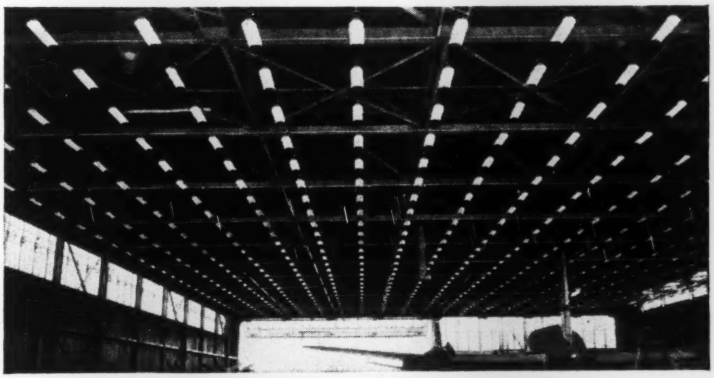

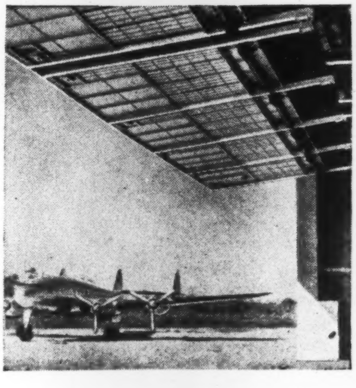

ABOVE. A view of the Truscon Structural Steel in the Lockheed Hangar, with the Ferrobord Steeldeck Roof above it, and the Pivoted Steel Windows, mechanically operated, at the left. Write for complete illustrated literature on these products.

AT LEFT. One of the electrically operated Truscon Braced Vertical Lift Canopy Doors installed in the Lockheed Building. Truscon can supply efficient steel doors for any type or size of hangar installation. Write for illustrated literature describing the entire Truscon line.

ABOVE. Detail view of the Truscon Ferroplate Siding, an innovation in hangar building construction. Offers the advantages of economy, quick construction, rigidity, future application of insulation, and many other desirable features. Write for complete detailed description of this new industrial steel siding material.

Lockheed Hangar Building, MacArthur Field, Long Island, New York. Lowe Construction Company, Contractors; Clarkson & Petrov, Architects.

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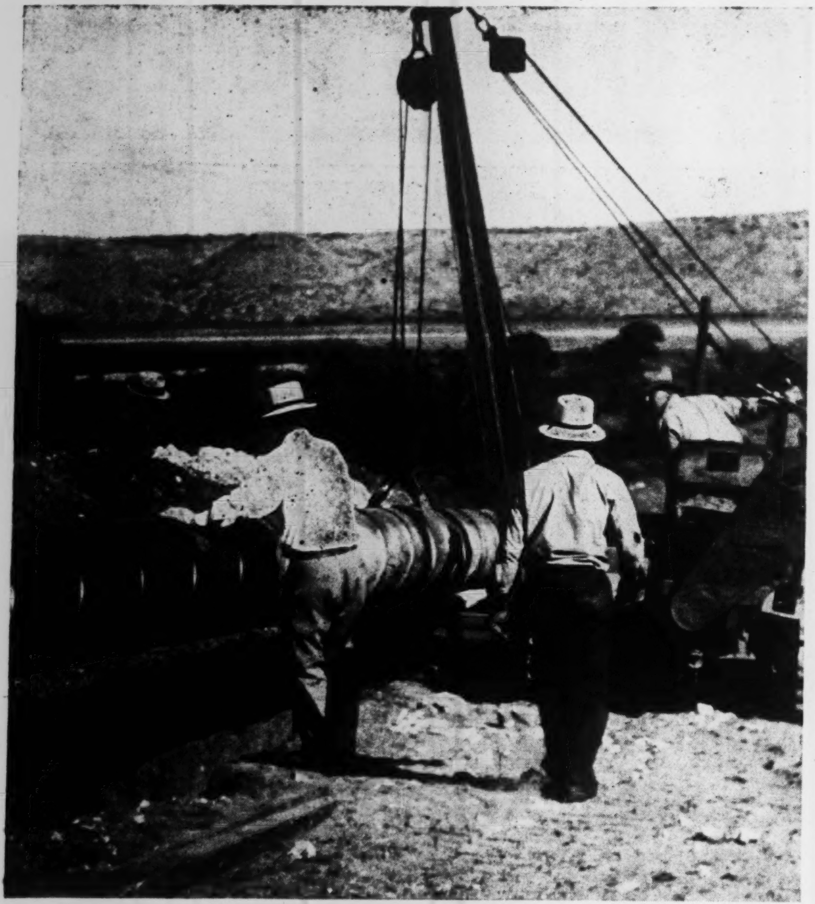

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PUBLIC BLDGS. (Low Bidders, Cont'd.)

No. MW-101-1, from D. H. Dave Inc. & Frank Freeman, 188 Montague St., Brooklyn. **$314,-100.** CD 5/27.

Ore., Tillamook—Tillamook Co., Courthouse, June 8, hospital, from Ralph & Horwitz, [illegible] N. Flint St., Portland. **$980,566.** CD 5/21—ENR 5/27.

B. C., New Westminster—Province of B. C., Parliament Bldgs., Victoria, 100-bed rein.-con. New Westminster Mental Hospital, from Bennett & White Constr. Co., Ltd., 660 Howe St., Vancouver. **$262,795.** CD 11/24—ENR 11/27.

CONTRACTS AWARDED

Ala., York—Sumter Co. Bd. Educ., high school gymnasium, to J. E. Johnson & Co., York. **$267,741.** Bids 6/4. CD 5/24—ENR 5/27.

Ill., Waukegan — Community Consolidated Dist. 3, Waukegan, general contract 2 story, brick, school addn., to P. W. Peterson & Co., Waukegan. Est. **$375,000.** Bids 5/10.

Ia., Charles City—Bd. Educ., general contract school addn., to Henkel Constr. Co., Mason City. **$256,244.** Bids 5/24. Keffer & Jones, 202 Masonic Temple Bldg., Des Moines, archts. CD 1/28—ENR 2/19.

Mich., Adrian—Bd. Educ., Adrian, 8 and 4 room addn. to 2 schools, to Krieghoff-Lenawee Co., Adrian. **$339,321.** CD 12/4—ENR 12/25.

●**Tex., Houston**—Texas State University for Negroes, 3200 Cleburne St., Houston, and Bd. Regents, Austin, administration and auditorium, to Knutson Constr. Co., 2238 Commerce Bldg. **$1,637,000.** CD 5/18—ENR 5/20.

Tex., Robstown — Robstown Independent School Dist., Robstown, school and gymnasium, to Lawless & Alford, P. O. Box 1248, Corpus Christi. **$288,302.** Bids 5/31. CD 5/18—ENR 5/20.

B. C., Grand Forks—Trustees School Dist. 12, Grand Forks, 1 and 2 story, frame, stucco high school. Owner builds. **$365,000.** CD 2/28—ENR 3/20.

B. C., Kelowna—Trustees of School Dist. 23, Kelowna, 2 story, frame, stucco 14 classroom etc. high school, to Smith Bros. & Wilson, Ltd., 1267 Richards St., Vancouver. **$407,000.** Bids 5/20, awarded 6/5. CD 5/7—ENR 5/13.

B. C., Rutland—Trustees School Dist 23, Kelowna, 2 story, T-shaped, frame, stucco, brick veneer front high school, to Smith Bros. & Wilson, Ltd., 1267 Richards St., Vancouver. **$337,815.** Bids 5/6, awarded 6/5. CD 4/21—ENR 4/29.

Ont., Hamilton—Hamilton General Hospital Bd., J. F. Berry, city clk., Hamilton, Senior Nurses' Residence exten., to The Tope Constr. Co., 677 Main St. W., about **$743,171.** CD 3/2—ENR 3/11, under LB.

COMMERCIAL BUILDINGS

BIDS ASKED

Bids Asked July 12

Minn., Minneapolis — Lang & Raugland, archt., 502 Wesley Temple Bldg., 2 story, brick, tile science bldg. for Augsburg College, Lutheran Free Church, B. Christensen, pres., 8 St. and 21 Ave. S. $250,000. CD 7/14/44—ENR 7/27/44.

SOON LETS CONTRACT

D. C., Wash.—Catholic University soon lets contract 2 dormitory bldgs. Murphy & Loecraft, 1518 P St. N.W., archts.

Ga., Decatur — Decatur First Methodist Church, soon lets contract church alterations, addn. Ivey & Crook, Candler Bldg., Atlanta, archts.

N. Y., Mt. Alvernia—Province of the Immaculate Conception, Franciscan Fathers, Wappenger Falls, soon lets contract 3 story theological bldg. Vincent S. Todaro, 1901 W. 12 St., Brooklyn, archt.

N. C., Hickory—Icard Mfg. Co., Hickory, soon lets contract braider bldg. and office. Charles T. Main, 80 Federal St., Boston 10, Mass., archt.

Tex., Fort Worth—W. G. Clarkson, archt., First Natl. Bank Bldg., soon lets contract 1 story partial bsmnt., 142 x 200 ft., brick, stone, office 13 and Summit Sts., for J. E. Foster & Son, Petroleum Bldg. CD 5/23/47—ENR 6/5/47.

LOW BIDDERS

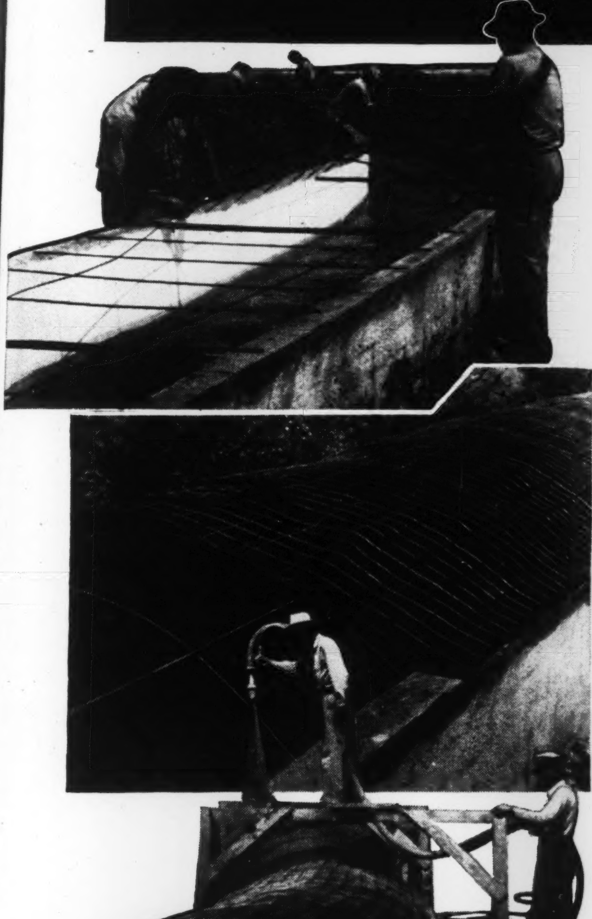
Ga., Columbus—Wynnton Methodist Church, c/o J. J. Biggers, archt., Columbus, rejected bids, church. L. B. **$257,000.** Project postponed. (**Correction**—status) CD 5/13—ENR 5/20, under CA.

CONTRACTS AWARDED

Calif., Hayward—Grimm, Riederman & Badding, 185 Belleview Dr., San Leandro, 32 residences in 6 acre tract, Castro Valley Dist. to Nick Badding, 185 Belleview Dr., San Leandro, Est. **$350,000.**

Conn., New Britain—St. Maurice's Roman Catholic Parish, New Britain, 2 story, bsmnt., 50 x 140 ft. church, Steele St., to E. & F. Constr. Co., 94 Wells St., Bridgeport. Est. **$250,000.** CD 5/11.

Pittsburgh Steeltex—*The Answer to a Tough Form and Reinforcement Problem*



Low Cost—Practical—Proved in Service

A unique application of Pittsburgh Steeltex Floor Lath is solving a difficult flume cover problem for the Vista Irrigation District, San Diego County, California. You may not have a long flume to cover but the ingenious use of Steeltex on this job may suggest a practical solution to some problem of yours.

The 12½ mile flume carries water from Lake Wohlford to the District. It lost capacity during summer months due to algae growths and Caddis fly infestation. Repeated attempts to eliminate the loss by coating the flume with various paints, greases and chemicals failed. Accordingly, a flume cover was decided upon. Several methods were investigated, but all proved to be too expensive or impractical until the arched cover with Steeltex forms was designed. Steeltex is a 3″ x 4″ wire mesh reinforcement laced to a waterproof cord-reinforced backing. The lacing wires are crimped to separate the backing from the fabric to provide automatic embedment from the weight of the mix.

Here is how 8,400 feet was covered in 1947. An additional 12,750 feet is being covered with Steeltex in 1948.

1 Last year ¼″ round reinforcing rods were set on 2 foot centers in holes notched into the top of the concrete sidewalls. This formed a 15″ high arch. Three ¼″ round rods were wired longitudinally over the lateral rods and the Steeltex laid over the rods. This year, 5/16″ holes were drilled into the concrete sidewalls for ¼″ lateral rods placed 15″ on centers and Steeltex is being clipped under the rods with hog rings. This makes a stiffer arch and uses less material and labor.

2 In this photo the Steeltex is in place. It proved to be very adaptable to the many curves of the flume and is credited with contributing to the low cost of the job. Each 4′ panel of Steeltex was lapped 3″. Expansion joints were provided every 100 feet by simply cutting the reinforcing wire and wiping out a 1″ section of gunite. Redwood manholes were put in place ahead of the cover work.

3 The Steeltex form was shot with an average of one inch of gunite. Portable equipment and ready-mixed sand and cement were used.

4 The cover was cured with Hunt Process, then white-washed as were the sides of the flume. The white coating serves to reflect the heat of the sun and eliminates practically all expansion cracking. The flies and algae have been eliminated. Wind-blown leaves, seeds, trash and small animals are kept out as well. The project is under the direction of H. H. Yackey, Engineer-Manager with L. R. Burzell, Assistant Engineer, in direct charge of the job for the Irrigation District. The Johnson Western Company was the contractor for last year's work and Leonard J. Schroeder of Escondido is the contractor for this year's work.

This is just one of many instances where Pittsburgh Steeltex Floor Lath is aiding many contractors to provide economical and efficient construction for floors, bridges and other work. For your copy of our catalog D. S. 133 or for information on how you may order Pittsburgh Steeltex, write today to Pittsburgh Steel Products Company, 3236 Grant Bldg., Pittsburgh 30, Pa.

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COMMERCIAL BLDGS. (Contracts Awarded, Cont'd.)

Del., Wilmington—Quality Homes, Inc., 418 N. American Bldg., residential development, Pine St., 26 and 27 Sts., separate contracts. Est. **$250,000.** Morton E. Bleich, 418 N. American Bldg., archt.

Fla., Miami Beach—Becker & Pollack, c/o contractor, apartment hotel to Zaret Constr. Corp., 1540 Washington Ave. Est. over **$250,000.**

●La., Baton Rouge—Villa Rose Apartments, c/o contractor, 152 apartment units, to Lobrano Mfg. & Constr. Co., 1301 Highland Rd. **$1,600,000.**

Pa., Homestead—St. Ann's Church, 1207 Sylvan Ave., 1 story church, parochial school and convent, separate contracts. Est. **$400,000.** CD 11/16/45—ENR 11/29/45.

Pa., Ross Twp.—McKnight Homes, Inc., R. D. 4, Pittsburgh, 1 and 2 story, 100 x 300 ft., brick, tile, steel shopping center and theater, McKnight Rd. Owner builds. **$700,000.** Jared E. Tillotson, Perrysville, archt.

Tex., Kilgore—Kilgore Home Builders, Inc., Kilgore, residences and apartments, force account. **$300,000.** CD 6/3—ENR 6/17.

Tex., McAllen—Robert A. Rowland, McAllen, Unit 3, group frame residences, own forces. **$250,000.** E. Reed, 308 Redwood St., San Antonio, archt.

Que., Quebec—Parish of St. Coeur of Mary, Rev. M. Lamontagne, cure, 164 Grand Allee, 3 story, 52 x 137 ft., stone, brick, church annex, to J. O. Lambert, 6 Garagouthier St. About **$250,000.** CD 5/9—ENR 5/22.

INDUSTRIAL BUILDINGS

BIDS ASKED

Bids Asked About August 1

Ga., Monroe—WAREHOUSE, etc.—Walton Electric Membership Corp., c/o J. L. Taylor, supt., Monroe, warehouse and office. $90,000.

Bids Asked

Conn., Mystic—SERVICE GARAGE, SHOWROOM—Brown Buick Co., 2 Greenmanville Ave., 1 story, brick, concrete service garage, showroom, Greenmanville Ave. $68,000. Schofield & Lindsay, 309 State St., New London, archts.

SOON LETS CONTRACT

Ga., Lavonia—PLANT—A. J. Bartson, Inc., Midland Park, N. J., soon lets contract upholstery mfg. plant. $500,000. Eubanks-Caldwell, Boxley Bldg., Roanoke, archts. CD 3/2/47—ENR 3/4/48.

Minn., Wheaton — Wheaton Co-operative Creamery, Wheaton, soon lets contract 1 and 2 story, 20 x 238 ft., brick, tile creamery addn. $70,000. M. & G. Buetow, 1931 University Ave., St. Paul, archt.

LOW BIDDERS

Wis., Milwaukee—GARAGE—Edwards Motor Co., 691 W. Wisconsin Ave., Zone 8, rejected bids May 31, 2 story, 60x150 ft. garage addn. CD 5/18—ENR 5/20.

CONTRACTS AWARDED

Calif., Los Angeles—WAREHOUSE, etc.—Southern Calif. Gas Co., 810 S. Flower St., warehouse, office, truck and auto storage yard, to Waale, Camplan Co. & Smith Inc., 1670 Beverly Blvd. Est. **$150,000.** Bids 6/9, awarded 6/10. CD 5/21—ENR 5/27.

Ga., Atlanta — PLANT — Electric Storage Battery Co., c/o Robert & Co., archts., Bona Allen Bldg., battery mfg. plant, to Beers Constr. Co., 70 Ellis St. N.E. Est. **$600,000.** CD 5/18—ENR 5/20.

La., Lake Charles—SALES AND SERVICE—Bob Rader, Inc., Lake Charles, auto sales and service bldg., to Western Constr. Co., Lake Charles. **$75,000.**

N. C., Kings Mountain — PLANT — Park Yarn Mills, Kings Mountain, 2 story, 78x119 ft. plant addn., to C. T. Bennett, Kings Mountain. Bids 5/19. CD 5/18—ENR 5/20.

●O., Toledo — STILLS — Gulf Refining Co., Nicholas Bldg., 2 petroleum stills, 2935 Front St., to M. W. Kellogg Co., 225 Broadway, New York, N. Y. **$4,883,000.**

S. C., Greenville—WAREHOUSE—Woodside Mills, Greenville, 1 story, 90x210 ft. warehouse, to McKoy-Helgerson Co., Greenville. Bids 5/27. CD 5/18—ENR 5/20.

S. C., Rock Hill—PLANT—Arcade Cotton Mills, Rock Hill, 2 story, 100x124 ft. plant addn., to Triangle Constr. Co., Greenville. Bids 5/25. CD 5/18—ENR 5/20.

Tex., Beaumont — GARAGE — American Garage Building, Park and Bowie Sts., remodeling, expanding masonry garage, storage bldg., sub-contracts. Approx. **$200,000.** CD 6/9—ENR 6/17.

Tex., Houston — WAREHOUSE — Maxwell Steel Co. Inc., M. Esperson Bldg., warehouse. Owner builds. **$70,000.**

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INDUSTRIAL BLDGS. (Contracts Awarded, Cont'd.)

Va., Newport News—TRANSFORMER SUBSTATION, etc.—Chesapeake & Ohio Ry. Co., L. T. Nuchols, ch. engr., 823 Main St., Richmon, Zone 10, transformer substation and connecting power lines, to Enterprise Electric Co., Newport News. **$88,000.**

Wis., Laona—GENERATING PLANT—Connor Lumber & Land Co., Laona, 1 story, rein.-con., brick diesel electric generating plant, to Edward H. Meyer Constr. Co., 75 Main St., Oshkosh. Est. **$165,000,** incl. equip. Bids 4/26. CD 4/14—ENR 4/22.

Ont., Sudbury — WAREHOUSE — Brewer's Warehousing Co., Ltd., 350 Bay St., Toronto, warehouse, Lorne St., to Hill Clark-Francis, Ltd., 68 Lorne St. About **$153,000.** J. B. St. Sutton, 99 Larch St., archt.

UNCLASSIFIED

BIDS ASKED

Bids Asked July 1

†Arizona - Nevada — DISCONNECTING SWITCHES, etc.—Bureau Reclamation, Dpt. Interior, Phoenix, six 161,000 volt, six 34,500 volt, and twelve 7,500 volt disconnecting switches; one 161,000 volt and one 34,500 volt lightning arrestor, for Gila Substation, Davis Dam Project, Spec. R3-Px-7, Region 3. Walker R. Young, Bldg. 1A, Denver Federal Center, Denver, Colo., ch. engr. and archt.

Bids Asked July 7

†Ky., Fort Knox — SWIMMING POOL — U. S. Eng., P. O. Box 59, Louisville, swimming pool, Godman Field, Serial No. Eng-15-029-48-231.

Bids Asked July 8

†North Dakota — TRANSMISSION LINE TOWERS—Bureau Reclamation, Dpt. Interior, Building 1-A, Denver Federal Center, Denver, Colo., furnishing, del. f.o.b. cars shipping point or f.o.b. cars Williston, 2 steel river-crossing towers for 115 kv. Williston-Garrion Dam transmission line, Transmission Lines Unit, Missouri Basin Proj., Spec. 2293.

†Tenn., Oak Ridge—RIFLE RANGE TARGET BUTTS—Roane-Anderson Co., P. O. Box 456, Oak Ridge, rifle range target butts and firing points, Inv. No. 49-1.

Bids Asked August 2

†Illinois — MAGAZINES — U. S. Eng., 520 Merchandise Mart, Chicago, Zone 54, repairing 63 ammunition storage standard type magazines, incl. related work, etc. at Savannah Ordnance Depot, Savannah, Serial No. Eng-11-032-48-147. Extended date. CD 6/1—ENR 6/3.

LOW BIDDERS

Ga., Griffin—STADIUM—City; Bd. Educ., June 7, stadium, from Spalding Concrete Co., Griffin. **$67,148.** CD 5/28.

Oregon—RURAL DISTRIBUTION LINES—Columbia Basin Electric Co-operative, Inc., Heppner, rejected bids May 25, 412 mi. rural distr. lines. L. B. **$302,784.** CD 6/2—ENR 6/10, under LB.

†Utah — TUNNELS — Bureau Reclamation, Dpt. Interior, Provo, May 19, Tunnels, 1, 2, and 3, Salt Aqueduct, Spec. 2206, Schedule 1, Tunnels 1 and 2, from United Concrete Pipe Corp., Box 425, Baldwin Park, Calif., **$160,425;** Schedule 2, Tunnel 3, from M. F. Kemper Constr. Co., 3701 Overland Ave., Los Angeles 34, Calif., **$278,742.** CD 4/26—ENR 5/29.

CONTRACTS AWARDED

Illinois—RURAL DISTRIBUTION LINES—Corn Belt Electrc Co-operative, T. H. Hafer, mgr., 315 E. Front St., Bloomington, 67 mi. rural distr. lines, McLean Co., force account. **$135,000.** CD 5/27—ENR 6/10.

Minnesota—RURAL DISTRIBUTION LINES—Carlton County Co-operative Power Assn., Kettle River, labor only, 248 mi. rural distr. lines, Carlton, Aitkin, Pine, Itasca and St. Louis Counties, to Reither Constr. Co., Aitkin, **$120,000;** 37 mi. rural distr. lines, Carlton and Pine Counties, to Hallett Constr. Co., Crosby, **$82,689.** Bids 5/20. CD 5/10—ENR 5/13.

N. C., Shelby—SWIMMING POOL, etc.—Parks & Recreation Comn., Shelby, swimming pool and bathhouse, to A. A. Ramsey & Son, Shelby. **$94,471.** Van Wageningen & Cothran and V. W. Breeze & Assoc., Shelby, archts.

W. Va., Danville—YARD TRACKS—Chesapeake & Ohio Ry. Co., L. T. Nuchols, ch. engr., 823 Main St., Richmond, Zone 10, Va., altering yard tracks, to Echols Bros., Staunton, Va. **$701,000.**

Man., Hnausa—WHARF—Dpt. P. Wks., J. M. Somerville, secy., Ottawa, Ont., wharf, to Nelson River Constr., Ltd., 607 Union Trust Bldg., Winnipeg. About **$105,763.** Bids 6/9. CD 5/26—ENR 6/3.

N. S., Halifax—STREET LIGHTING—Municipality, street lighting, own forces. **$75,000.** R. M. MacKinnon, Halifax, city engr. CD 7/17/46—ENR 8/8/46.

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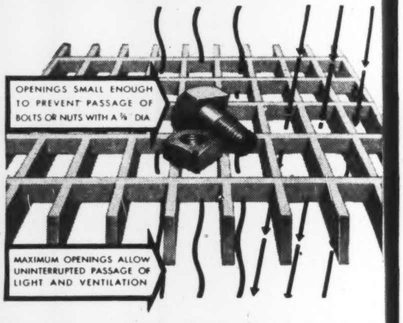
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CONSTRUCTION REPORTS

Bids Asked—Low Bidders—Contracts Awarded

Second Section

Compiled by Business News Department—Engineering News-Record, 330 W. 42nd St., New York 18, N. Y.

ELSIE EAVES, Manager *J. A. MAHONEY, Reports* *E. R. BIGGERSTAFF, M. R. ROESSLER, Statistics*

WATER SUPPLY

BIDS ASKED

Bids Asked June 28

Md., Towson—Baltimore Co. Comn., Courthouse, 17,035 lin. ft. 6- to 12-in. watermains, 8,959 lin. ft. 8 and 10 in. sewers, 2,950 cu. yd. channel excav., 3,580 lin. ft. 15- to 30-in. rein.-con. pipe, storm valves, fire hydrants, manholes, etc., for 1, 2, 8, 9, 13, 14 and 15 Elec. Dists., Contr. 131-D. S. & W. Plans deposit $5. Wm. F. Neale, Towson, co. engr.

Bids Asked June 29

Ind., Bloomington—Bd. Trustees, Indiana University, J. A. Franklin, treas., Administration Bldg., exten. watermains. $50,000.

N. Y., Carle Place—Bd. Water Comrs. Carle Place Water Dist., Town of North Hempstead, 459 Westbury Ave., Contr. 1, wells, pumping units; Contr. 2, electrical work; Contr. 3, pumphouses; Contr. 4, watermains, appurtenances; Contr. 5, elevated tank; Contr. 6, fence. Plans deposit $20. Sidney B. Bowne, 222 Front St., Mineola, engr. CD 2/3—ENR 2/10.

Bids Asked July 2

●**Colo., Denver**—City and Denver Co. Bd. Water Comrs., City & County Bldg., water main exten., 42 in. conduit from W. 32 Ave. and Sheridan Blvd. north to W. 33 Ave., east to Zenobia St., north to W. 45 Ave.; 36 in. conduit east to Lowell Blvd., 24 in. conduit to Grove St. $488,000; 42 in. conduit from Ashland Ave. reservoir at W. 29 Ave. and Fenton St. east to Sheridan Blvd., connecting with other mains and pump station, $120,000; 42 in. conduit from Kearney St. and Mountview Blvd. to vicinity of Monaco, 24 in. to Xanthia St., connecting with 24 in. north and south main, $350,000. John Burgess, c/o owner, engr. CD 6/9—ENR 6/17.

Bids Asked July 7

N. B., Saint John—J. M. Somerville, secy., c/o Dpt. P. Wks., Ottawa, Ont., pumphouse and water reservoir Lancaster Hospital. About $75,000. Plans deposit $15. G. Brault, c/o owner, archt.

Bids Asked July 8

Mich., Detroit—Bd. Water Comrs., Water Bd. Bldg., 735 Randolph St., approx. 2,046 lin. ft. 66 in. watermain tunnel sect., etc., East 8 Mile Rd. Contr. WS-37B.

Bids Asked About July 15

N. C., Forest City—City, WW imprvs. $500,000. Harwood Beebe Co., 208 Montgomery Bldg., Spartanburg, consult. engr. CD 4/2—ENR 4/15.

LOW BIDDERS

Ark., West Memphis—City, June 8, 500,000 gal. steel water tank, from Pittsburgh-Des Moines Steel Co., 1015 Tuttle St., Des Moines, Ia. **$59,040.** A. E. Heagler, Exchange Bldg., engr. CD 5/27—ENR 6/3.

Calif., Oakland—East Bay Municipal Utility Dist., 512 16 St., June 9, 29,800 lin. ft. 2- to 12-in. c.c. watermains in Durant Park Highlands and Chabot Park Highlands, Spec. LS-425, from O. A. Fogelberg, 1416 Benton St. **$49,799.** CD 6/4.

Calif., Oakland—East Bay Municipal Utility St., 512 16 St., June 9, installing approx. 9,800 lin. ft. 12 in. c.i. and welded steel watermains in Alameda Co., LS-424, from Underground Constr. Co., 75 Ave. and San Leandro Blvd. **$63,634.** CD 12/15/43—ENR 12/20/43.

Calif., San Francisco — P. Utilities Comn., City Hall, rejected bids May 18, erecting elevated tank, Potrero Heights Dist., Dist. No. 473-A. L.B. **$28,707.** CD 5/25—ENR 5/27, under LB.

Colo., Gunnison—City, rejected bid June 11, watermains, conduit and reservoir, **$72,000.** R. J. Tipton & Assoc., 602 Insurance Bldg., Denver, engrs. and archts. CD 5/25—ENR 5/27.

Ill., Chicago — City, Dpt. Purchases, Contrs. & Supplies, City Hall, June 14, 371 pcs. 24- to 50-in. B 12 ft. length c.i. water pipe, from U. S. Pipe & Foundry Co., 122 S. Michigan Ave., **$100** per ton. CD 6/7—ENR 6/10.

Md., Towson — Baltimore Co., Courthouse, June 7, watermains, sewers, etc. Loch Raven Village, Constr. 129, D. S. & W, from Philip D'Adamo Constr. Co., 5014 Reisterstown Rd., Baltimore. **$175,447.** CD 5/28—ENR 6/3.

●**N. Y., New York**—Comr. Water Supply, Gas & Electricity, Municipal Bldg., Zone 7, June 15, steel, c.i. watermains, appurtenances, Archer Ave., 138 Pl., Rockaway, Sutphin, Queens and Van Wyck Blvds., Queens Boro, from Oakhill Contr. Co. Inc., 74-20 Caldwell St., Maspeth. **$1,226,000.** CD 6/7—ENR 6/10.

Pa., Birdsboro—Dpt. Property & Supplies, 18 and Herr Sts., Harrisburg, June 16, alterations, addns. to water supply, plumbing and sewage disposal sys. at bathhouse of Six-Perry Day Use Area, French Creek Park, near here, from Corbit's Inc., 225 S. Front St., Reading. **$12,600.** A. F. Jones, c/o owner, ch. engr.

Wash., Juanita—Water Dist. 72, Kirkland, water sys., from Stateside Constr. Co., 905 10 Ave. S., Seattle. **$63,734.** CD 6/6/47—ENR 6/26/47.

Wis., Monona (P. O. Madison)—Bd. Pub. Wks., Monona, June 7, water pipe, watermains and well, from Telseth Constr. Co., Menominee. **$58,000.** General Eng. Co., Portage, engr.

CONTRACTS AWARDED

Ga., Austell—City, water line exten., to J. B. McCrary Constr. Corp., 22 Marietta St. Bldg., Atlanta. **$53,500.**

Ind., Valparaiso—Bd. Water Wks., imprv. WW, altering pumping plant and 70 ft. clarifier, deep well, to Larson & Danielson, Laporte. **$54,905.** CD 3/26—ENR 4/1, under LB.

S. C., Seneca—Towns, exten. watermains southern section of town, to Reid & Abee, Inc., Asheville, N. C. **$30,000.**

Tenn., Springfield—Springfield Utility Comn., Springfield, filtration plant, to G. E. Moore & Co., Greenwood, S. C., **$420,438*****300,000 gal. elevated tank, to Chattanooga Boiler & Tank Co., 1011 E. Main St., Chattanooga, **$39,000***** watermain extens., to Cunningham-Anderson, Clarksville, **$40,163.** Grand total $499,601. CD 6/15—ENR 6/17, under LB.

B. C., Vernon—City, City Hall, earthen dam, replacing pipe from intake on BX Creek to Pine St. Reservoir, own forces. **$110,000.** F. G. de Wolf, Vernon, city engr.

Que., Quebec City — Municipality, F. X. Chouinard, clk., WW between Hotel Dieu Hospital and 18 and 22 Sts. in St. Pascal de Baylon Ward, own forces. **$38,900.** Ed. Hamel, Quebec City, city engr.

PROJECTS COVERED

Projects—By Size

Construction projects here reported cover the United States and Canada, are of these minimum sizes or larger: water supply, earthwork, waterworks $28,000; other public works $50,000; industrial buildings $68,000; other buildings $250,000.

Classes of Construction

(Name in order of Listing)

Water Supply
Sewers, Waste Disposal
Bridges
Streets & Roads
Earthwork, Waterways
Latin America
Public Buildings
Commercial Buildings
Industrial Buildings
Unclassified

Stages Reported

PROPOSED WORK: Including appointment of engineers or architects.

BIDS ASKED (new announcements only). For full calendar, see also preceding issues of ENR.;

LOW BIDDERS: On jobs below $500,000 value all low bidder news will be the final reports published on the projects involved except where award is not made to the low bidder. In this case, a supplementary contract award report will be published.

CONTRACTS AWARDED: Except awards to low bidders previously reported in low bidder stage.

Dates shown are of issue in which last previous report was published.

Symbols and Abbreviations Include:

♦ Federal Government
● Project of $1,000,000 or over.
ENR Engineering News-Record
CD Engineering News-Record Construction Daily

SEWERS, WASTE DISPOSAL

BIDS ASKED

Bids Asked June 29

Md., Hyattsville—Washington Suburban Sanitary Comn., Hamilton St., 10,200 ft. 24- to 30-in. rein.-con. sewers Southwest Branch Trunk Sewer, Contr. 331-S. Plans deposit $5. Harry R. Hall, Hyattsville, ch. engr.; adv. ENR 6/24.

N. Y., New York—President Bronx Boro, Bronx County Bldg., 851 Grand Concourse, New York, Zone 51, sewer, appurtenances, W. 176 St., E. Tremont and Andrews Aves.

Bids Asked June 30

Ont., Mount Forest—C. A. Meadows & Assoc., engrs., 4 Grange Rd., Toronto, sewage treatment plant and equip. About $100,000. CD 3/21/46—ENR 4/4/46.

Bids Asked July 6

Md., Hyattsville—Washington Suburban Sanitary Comn., Hamilton St., 7,000 ft. 24- to 30-in. rein.-con. sewers Central Ave. and Cabin Branch Trunk Sewer, Contr. 333-S. Plans deposit $5. Harry R. Hall, Hyattsville, ch. engr.; adv. ENR 6/24.

Bids Asked July 7

N. Y., Ellicott—Town Bd., Town Administration Bldg., Falconer, 34,000 ft. 8 and 10 in. lateral sewer, appurtenances, in various streets and locations in Sewer Dist. 3. Plans deposit $10. William S. Lozier Co., 10 Gibbs St., Rochester, Zone 4, engr.

N. Y., West Coxsackie—Bureau Contracts & Accounts, Albany, replacing sewage pumps, erecting pump house, installing sewer pipe, New York State Vocational Institution.

Ore., Medford—City, City Hall, south feeder sewer, 8,232 lin. ft. excav. and backfill, 8,089 lin. ft. 16 in. welded steel pipe. Plans deposit $10. Robert A. Duff, city engr. CD 5/16/45—ENR 5/31/45.

Bids Asked July 8

Ill., Albion—City, County Court House, Albion, imprv. exten. sewerage sys., appurtenances, etc. Plans deposit $25, $10 refundable. James G. Cooney, Christmann Bldg., 19 N. Illinois St., Belleville, consult. engr.

Bids Asked July 13

N. Y., Brooklyn—Dpt. P. Wks., Municipal Bldg., Zone 7, Contr. 9, addnl. docking facilities, Plans deposit $25; Contr. 9E, extens. and addn. to Coney Island Sewage Treatment Works, addnl. docking facilities, Plans deposit $10. CD 1/26—ENR 1/29, under LB.

Bids Asked July 14

N. Y., Ramapo—Town Bd., Town of Ramapo, 59 Lafayette Ave., Suffern, general construction, heating, plumbing and electrical work for incinerator proj., Contrs. 1, 2, and 3. Plans deposit $20. Seelye, Stevenson & Value, 101 Park Ave., New York, Zone 17, consult engrs., adv. ENR 6/24.

LOW BIDDERS

Ala., Ashford—City, June 10, sanitary sewer lines, Section 2, from M. R. Thomason, 121 S. Lewis St., Montgomery, **$58,731;** Sect. 3, from Schley Gordy, 1510 Hilton Ave., Columbus, Ga. **$70,194.** CD 6/17—ENR 6/24.

Calif., Oakland—East Bay Municipal Utility Dist., 512 16 St., June 9, intercepting sewer, Sect. 3, SD-17, exten. from point near intersection Hearst Ave. and 2 St. to point near intersection Potter St. and Bolivar Dr. north intercepting sewer, from Healy-Tibbitts Constr. Co., 211 Brannan St., San Francisco. **$351,869.** CD 5/21—ENR 5/27.

Kan., Ottawa—City, L. J. Craler, clk., 2 sewage lift stations, 3,460 ft. 6 in. c.i. force mains, from Constant Constr. Co., 619 Vermont St., Lawrence. **$53,245.** Est. $54;254. CD 9/24/46—ENR 9/26/46.

La., Haynesville—Town, June 8, sewage disposal plant, from Koller Constr. Co., Tradesman National Bank Bldg., Oklahoma City, Okla. **$99,992.** CD 5/26.

La., Lake Charles — First Sewerage Dist., Lake Charles, rejected bids June 8, sewage collection sys. for Area B. LB. **$331,095.** Will readvertise. CD 5/6—ENR 5/13.

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SEWERS, WASTE DISPOSAL (Low Bidders, Cont'd.)

La., Opelousas—City, City Hall, June 8, sewage collection and disposal facilities; Proposal A, collection sys., from Taylor-Wheless Co., Jackson, Miss., **$148,099;** Proposal C, sewerage treatment plant, from Koller Constr. Co., Tradesmen National Bank Bldg., Oklahoma City, Okla., **$375,000.** CD 5/6—ENR 5/13.

N. C., Chapel Hill—Town, June 11, general contract sewerage imprvs., from Boyd & Goforth, Inc., 617 N. Smith St., Charlotte, **$259,296;** piping for sewerage imprvs., from N. E. Brewer, Winston-Salem, **$128,484.** CD 5/25—ENR 5/27.

Ore., Pendleton—City, City Hall, sewer, incl. sewer tile and sewer pipe, street imprvs., etc., from Grimstadt & Vandervalt, Astoria. **$56,000.** Est. $55,000. Frank B. Hayes, city engr. CD 1/14/47—ENR 2/6/47.

Tex., Wharton—City, F. S. Haines, mayor, June 15, sanitary sewer collection sys. extens., from Gerald Mora, 312 Sabine St., Houston. Approx. **$71,000.** CD 6/2.

CONTRACTS AWARDED

Ala., Ashford—City, sanitary sewer lines, to Nash Contg. Co., Macon, Ga. **$56,730.** Bids 6/10. CD 6/4.

Mass., Boston — City, James E. Curley, mayor, City Hall, 3,000 ft. storm sewers, in Brighton Ave., Brighton, to Baker & Co., West Roxbury, **$138,135.** Bids 5/20. CD 5/27.

Mo., Kansas City—City, Reed McKinley, dir. P. Wks., City Hall, 410 ft. 84 in. rein.-con. storm and sanitary sewers, Prospect Ave., incl. tunnel under railroad tracks and junction chambers, etc., to C. S. Foreman Co., 1221 Baltimore Ave. **$96,900.** Bids 3/23. CD 1/21—ENR 1/29.

O., Warren—City, Walter Pestrak, safety-service dir., complete Hoyt Run No. 2 Storm Sewer, to Continental Constr. Co., 1657 Mahoning Ave., Youngstown. **$147,259.** CD 11/12/47—ENR 11/27/47.

Wash., Chehalis—City, City Hall, 3,970 ft. 15-to-21-in. trunk sewer, 31,000 ft. 6-to-15-in. lateral sewers and pumping station to Harold E. Olds, 3111 N. 2 St., Tacoma, **$142,019.** Est. over $50,000. Bids 5/24. CD 5/5—ENR 5/13.

Wis., Pardeeville—Village, sewage treatment plant, force account. Bids 5/12 rejected. CD 5/4—ENR 5/6.

BRIDGES

BIDS ASKED

STATE HIGHWAY LETTINGS

June 29	*July 9*
Massachusetts	**Kentucky**
North Carolina	**Tennessee**
July 2	*July 14*
Pennsylvania	**California**
Washington	*July 21*
July 7	**California**
Louisiana	
New Jersey	

Bids Asked July 6

Calif., Los Angeles—Bd. Supervs. Los Angeles Co., 501 Hall of Records, reconstructing timber deck, structural steel Vineland Ave. bridge, approaches, North Hollywood, $50,000. Plans deposit $3. H. E. Hedger, 751 S. Figueroa St., c/o flood control engr.

Bids Asked July 15

+Arizona-Nevada—Bureau Reclamation, Dpt. Interior, Davis Dam, furnishing, erecting structural steel for highway bridge across forebay channel at Davis Dam, Davis Dam Project, on Colorado River, near Kingman, Ariz., Spec. 2289. Walker R. Young, ch. engr.

Bids Asked July 20

La., New Orleans—City, City Hall, 1,212 ft. rein.-con. overpass structure carrying two 36 ft. roadways and two 5 ft. sidewalks over N.O. Terminal Co. tracks on Elysian Fields Ave. at Florida Ave. Plans deposit 25. G. A. Heft, Terminal Station, engr.

LOW BIDDERS

●Alabama — State Hy. Dpt., Montgomery Birminghams First Avenue Viaduct, 10 blocks long, spanning all rail line passenger service into both the Terminal Station and the Louisville & Nashville R.R. Passenger station, carry U. S. Hy. 11 and one prong of U. S. Hy. 78 Birmingham, Jefferson Co., from Frazier-Davis, 1319 Macklind St., St. Louis, Mo. **$1,241,056.**. CD 6/1—ENR 6/3, under Streets, etc.

+Mississippi—P. Roads Admin., 305 Medical Arts Bldg., Florence, Ala., June 8, bridge, Natches Trace Parkway, Pro. 3L3, from M. & W. Constr. Co., Tupelo. **$103,423.** CD 5/28.

Kansas—State Hy. Dpt., clk., Troy, received no bids June 4, continuous rein.-con. slab span bridge 7-22-26.4, over Mill Creek, approx. 1 ½ mi. northwest of Iowa Point on K 7, Doniphan Co. CD 5/20—ENR 5/27.

Nevada—State Hy. Dpt., Carson City, June 10, Truckee River Bridge and 0.123 mi. approaches near State Mental Hospital, Washoe Co., from Silver State Constr. Co., Fallon. **$95,353.** CD 5/27—ENR 6/3.

Pa., Pittsburgh—Comrs. Allegheny Co. Dpt. P. Wks., County Office Bldg., repaving West End-North Side Bridge. (No. 3 Ohio River), from Harrison Constr. Co., 1101 Western Ave., **$131,325.** Est. $150,000. CD 12/15/43—ENR 12/23/43.

Rhode Island—State Hy. Dpt., Providence, June 9, 0.152 mi. rein.-con. slab bridge, approaches, Johnston, from General Eng. & Constr. Co., 32 Broadway, Providence. **$53,384.** CD 5/27—ENR 6/3.

BRIDGES (Contracts Awarded)

CONTRACTS AWARDED

Calif., Napa—Napa Co., Courthouse, 414 ft. bridge, consisting steel truss lift span, structural steel girder approach spans supported on rein.-con. abutments, piers and bents across Napa River, and 62 ft. bridge consisting rein.-conc. slab span supported on rein.-con. bents across Cayetano Creek, to Erickson-Phillips & Weisberg, 3341 Telegraph Ave., Oakland. **$359,525.** Bids 6/8. CD 5/19—ENR 5/27.

Kentucky—Chesapeake & Ohio Ry. Co., L. T. Nichols, ch. engr., 823 E. Main St., Richmond 19, Va., strengthening wing walls and repairing masonry at Oneonta **$98,600** and exten. bridge NJ Cabin **$95,210** own forces,.

STREETS AND ROADS

BIDS ASKED

STATE HIGHWAY LETTINGS

June 29
Massachusetts
North Carolina
July 2
Pennsylvania
Washington
July 7
New Jersey
July 9
Kentucky
July 14
California
July 23
Pennsylvania
Tennessee

Bids Asked June 29

N. Y., New York—President Bronx Boro, Bronx County Bldg., 851 Grand Concourse, Zone 51, sheet asphalt on concrete repaving Brandt Pl. and Jackson Ave., incl. furnishing, adjusting curb and sidewalk, bldg. and rebuilding inlets and receiving basins, etc.

Bids Asked July 12

Wash., Ellensburg—City, City Hall, surfacing 5 streets. $74,424.

SOON LETS CONTRACT

Ark., Little Rock — Capitol Transportation Co., 1000 North St., soon lets contract imprv. approx 34,000 lin. ft. municipal streets. Plans deposit $15. John P. Powers Co., 114 W. 2 St., engr. CD 4/7—ENR 4/22.

LOW BIDDERS

Alabama — State Hy. Dpt., Montgomery, June 11, base and double surface 13.316 mi. on Sunny South and Lower Peach Tree Rds., Wilcox Co., from Dozier Constr. Co., Mt. Meigs, **$135,885;** grading, drainage, base, 4.635 mi. Pineapple-Snow Hill Rds., Wilcox Co., from Joe F. Walters, Troy, **$63,200.** CD 6/1—ENR 6/3.

California—State Div. Hys., Sacramento, rejected bids June 15, imprv. 2.5 mi. Mono Co. L.B. **$59,765.** CD 6/9—ENR 6/17, under LB.

California—State Div. Hys., Sacramento, June 16, imprv. 4.3 mi., bridge, between 3.5 mi. east of Fairfield and 0.4 mi. east of Alamo Creek, Solano Co., from Harms Bros., Route 4, Box 2220, **$789,867;** imprv. 1.8 mi. Crow Canyon Rd. between 0.2 mi. southwest of county line and State Highway Route 107 near San Ramon, Alameda and Contra Costa Counties, from Louis Biasotti & Son, 40 W. Clay St., Stockton. **$203,372.** CD 5/20—ENR 5/27.

Calif., Los Angeles—Bd. P. Wks., 153 City Hall, June 9 imprv. Colorado Blvd., Eagle Rock Dist., from Griffith Co., 1060 S. Broadway. **$252,992.** CD 6/8—ENR 6/10.

Calif., Los Angeles—Los Angeles Co., 501 Hall of Records, June 8, imprv. Century Blvd. to Anza Ave. and Prairie Ave. to 102 St., Inglewood, CC 0-628, from Griffith Co., 1060 S. Broadway, **$264,783.** Est. $300,000. Alfred Jones, 333 W. 2 St., engr. CD 5/21—ENR 5/27.

Calif., Sacramento—City, City Hall, June 11, imprv. streets in Folsom Blvd., Tract 2, from McGillivray Constr. Co., Box 873. **$102,694.** CD 6/1—ENR 6/3.

Colorado—State Hy. Dpt., Denver, June 4, oil processing 6.794 mi. State Hy. 17 between Pagosa Springs and Chromo, Colo., Proj. F. 024-1 (2), from Colorado Constructors, Inc., 1669 Broadway, Denver. **$50,760.** Mark U. Watrous, state hy. engr.

D. C., Wash.—Dist. Govt., Dist. Bldg., June 11, repairing approx. 7,000 sq. yd. concrete sidewalks, 3,500 cu. yd. concrete roadways, bases and alley pavements, and 2,500 tons asphaltic materials, west section, from Donaldson Paving Co., 20 Potomac Ave. S. E. **$232,665.** CD 6/7.

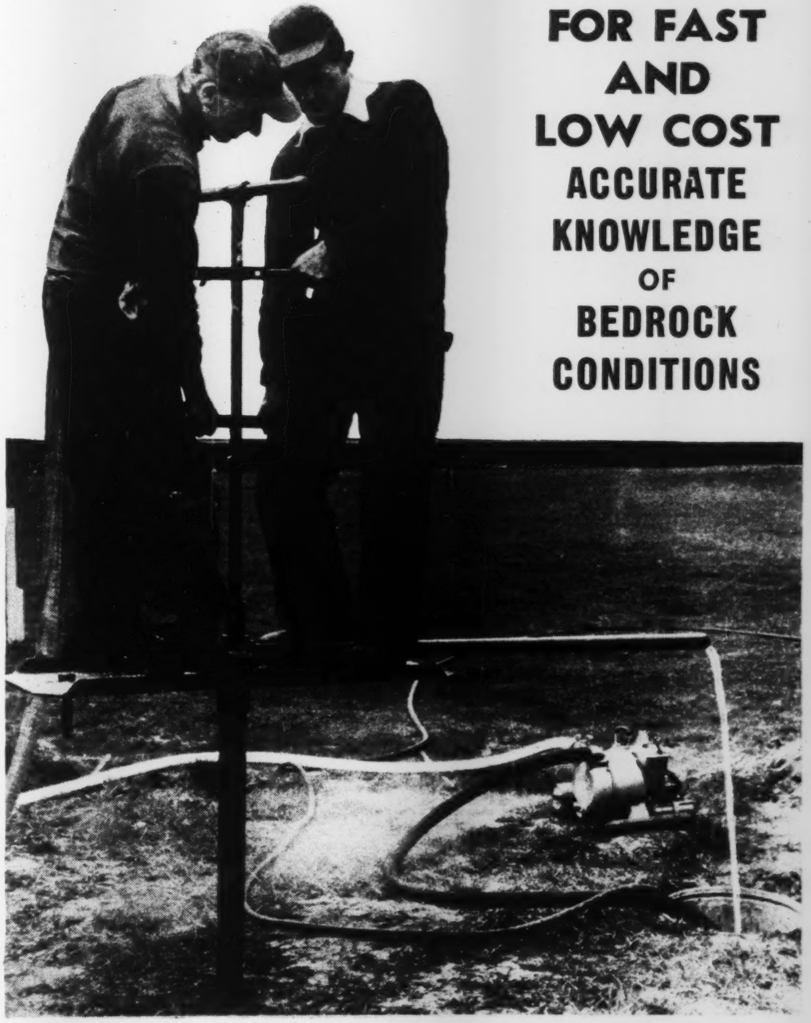
†Idaho — Pub. Roads Admin., Schreiber-McCann Bldg., Boise, June 10, imprv. 3.278 mi. North Fork Payette Hy., Boise National Forest Valley Co., from Quinn-Robbins, 1710 N. 17 St., Boise. **$332,734.** CD 6/2.

Ill., Belleville—St. Clair Co., c/o Co. Bd. Supervs., Courthouse, furnishing, del. 983,575 gal. road oil and 68,738 gal. asphalt, to various roads, from Bituminous Fuel & Oil Co., 320 N. 4 St., East St. Louis. Approx. **$128,330.**

Kansas—State Hy. Dpt., Troy, received no bids June 4, grading 8.039 mi., Proj. 75 S-311 (1), Part I, Pottawatomie Co. CD 5/20—ENR 5/27.

Md., Baltimore — Mayor & City Council, City Hall, June 9, alley paving Contr. CC 180, from Carozza Hamill & Co., 2441 N. Charles St., **$72,085;** paving streets, Contr. CC 91T, from Paramount Constr. Co., 3700 Gough St., **$56,039.** CD 6/3.

Minnesota—State Hy. Dpt., St. Paul, rejected bids May 21, 55,212 tons crushed rock aggregate for Maintenance Div., Rochester vicinity. L.B. **$82,265.** Will re-advertise. CD 5/5—ENR 5/13.



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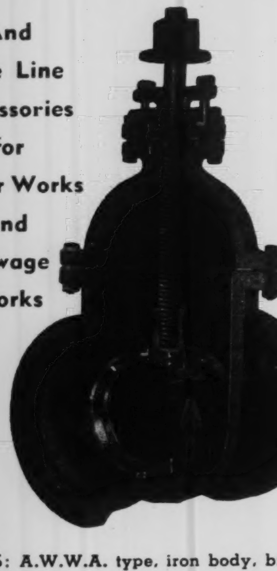

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STREETS AND ROADS (Low Bidders, Cont'd.)

Miss., West Point—City, rejected bids June 8, imprv. streets. CD 6/2.

Nevada—State Hy. Dpt., Carson City, June 10, imprv. 5.334 mi. Lincoln Co., and **(B)** imprv. U. S. 6, from Baker Junction to Nevada-Utah State Line on from Dodge Constr. Co., Fallon. **$104,320** and **$124,023** respectively; **(A)** road from Baker Junction to Nevada-Utah State Line near Garrison and road from Baker to Lehman Caves, from Hoops Constr. Co., Twin Falls, Idaho, **(A) $74,553.** CD 5/27—ENR 6/3.

Rhode Island—State Hy. Dpt., Providence, June 9, from M. A. Gammino Constr. Co., 728 Valley St., Providence, 0.485 mi. Providence, **$133,242;** 1.35 mi. Warwick, **$129,304;** 1.71 mi. Lincoln, **$210,914;** 0.877 mi. Pawtucket, **$119,655.** CD 5/27—ENR 6/3.

Tenn., Chattanooga—City, June 12, resurfacing various streets, from Gamble Constr. Co., 1512 Kyle St. **$251,191.** CD 5/18—ENR 5/20.

Tex., Houston—Harris Co., Comrs. Court, cancelled bids to have been opened June 18, asphalt paving 5.22 mi. Rosslyn-North Houston Rd. **$90,000.** Hugo Zapp, co. engr. CD 6/7—ENR 6/10.

Vermont—State Hy. Dpt., Montpelier, June 11, imprv. 2.117 mi. Waitsfield-Warren, from Derrick De Groot, Jericho, **$65,835;** 2.916 mi. Hardwick from Norman McLaughlin, Lunenburg, **$73,200.** CD 6/3.

†Virginia—Pub. Roads Admin., 1440 Columbia Pike, Arlington, June 17, construct Blue Ridge Parkway, Proj. 1P Q7-R8, Floyd, Franklin and Patrick Counties, from Adams & Tate Constr. Co., Box 60, Roanoke. **$160,864.** CD 6/7—ENR 6/10.

Wash., Seattle — City, County-City Bldg., Zone 4, rejected bids June 4, paving 42 Ave. S. L.B. **$67,808.** CD 6/8—ENR 6/10, under LB.

†Wyoming—Pub. Rds. Admin., c/o B. W. Matteson, div. engr., 2002 Capitol Ave., Cheyenne, June 9. 5.074 mi. Wyoming Forest Proj. 2-B6, C7, Wind River, Fremont Co., from Northwestern Eng. Co., Rapid City, S. D. **$357,539.**

CONTRACTS AWARDED

Ala., Gadsden — City, c/o Mayor, paving streets, to Southern Amiesite Co., 3501 5 St. N., Birmingham. **$381,341.** Bids 6/8. Gray Watford, city engr. CD 6/7.

Fla., Jacksonville—City, asphalt paving, etc. 63,663 sq. yd. various streets, to Duval Eng. & Contg. Co., foot of E. Adams St. **$82,125.** Bids 5/27, awarded 6/10. CD 5/17—ENR 5/20.

Ga., Augusta—City, George J. Roark, mgr., paving 20 streets, force account. Over **$50,000.**

Iowa — State Hy. Comn., Ames, imprv., Proj. MS-10, State Divs. No. III and No. II, to Iowa Road Bldg. Co., Fairmont, Minn., **$83,571** and **$72,402** respectively; Proj. MS-10 Div. No. I, Western Eng. Co., Harlan, **$81,792.** Grand total $237,764. Bids 6/8, awarded 6/9. CD 6/2.

Ia., Burlington—Des Moines Co., Burlington, grading, roads, to Leonard L. Wilson Constr. Co., Donnelson. **$50,124.** Bids 5/24. CD 6/6/46—ENR 6/13/46.

Ia., Council Bluffs—Bd. Supervs. Pottowattomie Co., Council Bluffs, imprv. 19,020 mi. roads, to Orville Eblen Constr. Co., Atlantic. **$122,486.** Bids 6/4. CD 5/26.

Minnesota—State Hy. Dpt., St. Paul, imprv. 9.7 mi. Maintenance Dist. 11, to Thornton Bros. Co., 1343 Dayton Ave. **$68,225.** Bids 6/11. CD 6/4.

Miss., Houston—Town, paving streets, to Clark Bros. Co., First Federal Savings & Loan Bank Bldg., Jackson. **$178,600.** Bids 5/28. CD 6/9—ENR 6/17, under LB.

Miss., Vicksburg—City, resurfacing various streets, to W. J. Runyon & Son., 543 S. Farish St., Jackson. **$51,216.** Bids 6/7.

N. J., Trenton—Mercer Co., Courthouse, surfacing roads, to Barrett Paving Co., Inc., 51 W. State St. **$124,159.**

Ohio—State Hy. Dpt., Columbus, imprv. 6.59 mi. Trumbull Co., to Herkner Constr. Co., 5450 Hamilton Ave., Cleveland. **$860,856.** Est. $828,600. CD 5/4—ENR 5/6, under LB.

Ore., Lebanon—City, City Hall, imprv. 19 blocks streets, to Warren Northwest, Inc., 9860 N.E. Hancock Dr., Portland. **$52,603.** Awarded 6/9. G. E. Whitcomb, city engr. CD 6/19/44—ENR 7/13/44.

South Dakota — State Hy. Comn., Pierre, imprv. 6.936 mi. Miner Co., to Peter Kiewit Sons Co., 1024 Omaha Natl. Bank Bldg., Omaha, Neb., **$118,395;** 11.502 mi. Lawrence Co., to Abbenhaus Constr. Co., Rapid City, **$127,653*****8.29 mi. Roberts Co., to J. L. Healy Constr. Co., 301 Western Surety Bldg., Sioux Falls, **$110,554*****16.02 mi. Roberts Co., to C. A. Wagner Constr. Co., 230 E. 8 St., Sioux Falls. **$206,442*****14.193 mi. S 137 (1), Sect. 1, Meade Co. and 17.153 mi. S 137 (1), Sect. 2, Meade Co., to J. R. England Constr. Co., Rapid City, **$53,091** and **$58,441** respectively. Grand total $675,576. CD 5/14.

Tex., Beaumont—City, addnl. 20 mi. street imprvs., reshelling, oil coating, reworking of topping, force account. **$50,000.** Clyde Black, city engr. CD 10/17/45—ENR 11/1/45.

Utah, Provo—City, G.I. Bench, recdr., City Hall, rock asphalt paving streets in paving Dist. 49 to Anderson & Sons, Price. **$58,009.** Bids 6/9. CD 6/2.

Utah, Salt Lake City—City, c/o Irma Sittner, recdr., City and County Bldg., plant mix bituminous resurfacing 3 South St. from State St. to 10 East St. and 12 East St. from 2 N. S. to 2 South St. to Gibbons & Reed Co., 259 West 3 South St. **$70,000.** Bids 6/3. W. D. Beers, city engr. CD 11/16/45—ENR 11/29/45.

Wash., Olympia—Thurston Co., Courthouse, light bituminous surfacing 54.44 mi. roads, to J. F. Forbes, Box 174. **$75,460.**

Wisconsin—State Hy. Comn., Madison, imprv. 8.926 mi. Chippewa Co., to Rein & Schultz, Washington Bldg., Madison, $268,484***29.815 mi. Clark Co., to S. J. Groves & Sons Co., 510 Wesley Temple Bldg., Minneapolis 4, Minn., **$751,888*****10.12 mi. Taylor Co., to Jay W. Craig Co., 1814 California St. N. E., Minneapolis 13, Minn., **$393,125.** Grand total $1,323,497. Bids 6/15. CD 5/28—ENR 6/3.

B. C., Courtenay—City, City Hall, reconstructing Main St. the Island Hy., to G. W. Ledingham & Co., Ltd., 1025 W. 77 Ave., Vancouver. About **$40,000.**

B. C., Oak Bay—Municipality, roads, own forces. **$60,000.** A. S. G. Musgrave, Oak Bay, city engr.

B. C., Saanich (Royal Oak P .O.)—Corp. of Saanich Dist., Royal Oak, 57½ mi. roads, day labor. **$50,000.** H. D. Dawson, Royal Oak, engr. CD 3/2—ENR 3/18.

Ont., Fort William—City, D. M. Martin, clk., paving streets, to Warren Bituminous Paving Co., Ltd., 1454 Bloor St. W., Toronto. Approx. **$61,982.** W. Macleman, c/o owner, engr.

Ont., Preston—Municipality, road construction, to Cornell Constr. Co., Ltd., Brantford. About **$120,000.** H. Johnstone, Prestone, engr.

EARTHWORK, WATERWAYS

BIDS ASKED

Bids Asked June 30

†Texas—U. S. Eng., Foot of Prytania St., New Orleans, La., 168,000 cu. yd. semi-compacted earthwork and three drainage structures on Cypress Creek levees, Jeff and Marion Counties.

Que., Petite Riviere—Secy., c/o Dpt. P. Wks., Ottawa, Ont., harbor imprvs., etc. About $50,000. Plans deposit $20. R. Blais, c/o owner, engr.

Bids Asked July 1

†North Dakota—Bureau Reclamation, Dpt. Interior, Building 1-A, Denver Federal Center, Denver, Colo., Dickinson Dam, Heart River Unit, Missouri Basin Proj. on Heart River about 2 mi. east of Dickinson, Spec. 2221. Extended date. CD 5/12—ENR 5/20.

Bids Asked July 6

†Illinois—U. S. Eng., 826 U. S. Court House and Custom House, 1114 Market St., St. Louis 1, Mo., repairing levees, Santa Fe Drainage and Levee Dist., Clinton Co., Serial No. Eng.-23-065-48-189. Extended date. CD 6/14—ENR 6/17.

Bids Asked July 7

N. S., North West Cove—Dpt. J. M. Somerville, secy. Dpt. P. Wks., Otawa, Ont., breakwater, North West Cove, (Scatari Island). About $70,000. Plans deposit $20. R. Blais, c/o owner, engr.

Bids Asked About July 8

†Illinois—U. S. Eng., 826 U. S. Court House and Custom House, 1114 Market St., St. Louis 1, Mo., 2 drainage structures, approx. 225 ft. 36 in. galvanized corrugated iron culvert pipe, other approx. 240 ft. 30 in. pipe, standard rein.-con. headwalls, sluice gates, installing mechanism, etc. Stringtown-Fort Chartres and Ivy Landing Drainage and Levee Dists., Item II-D, Randolph Co.

†Nebraska—U. S. Eng., 1709 Jackson St., Omaha 2, 5,680 lin. ft. revetment in or adjacent to Missouri River at Upper Kansas Peru Bends, 2 mi. upstream from Peru, Spec. Eng. 25-066-48-607.

Bids Asked July 8

†Colorado—U. S. Eng., Dpt. Army, Albuquerque, N. M., Templeton Gap Floodway from Templeton Gap to Monument Creek, tributary to Arkansas River, Colorado Springs, El Paso Co., Inv. Eng., 29-005-48-59. CD 6/1—ENR 6/3.

Bids Asked July 9

†Arkansas, Missouri, and Mississippi—U. S. Eng., P. O. Box 97, Memphis 1, Tenn., placing 4,720,000 cu. yd. earthwork, Lower St. Francis Levee Dist. of Arkansas, Lower St. Francis Levee Dist. of Missouri, the Upper Yazoo Levee Dist., Mississippi, and White River Levee Dist., Arkansas, Inv. Eng. 40-041-48-178.

Bids Asked About July 12

†Illinois—U. S. Eng., 826 U. S. Court House and Custom House, 1114 Market St., St. Louis 1, Mo., Grand Tower Drainage and Levee Dist., incl. placing approx. 165,000 cu. yd. earth in construction 6,940 lin. ft. levees, Jackson Co.

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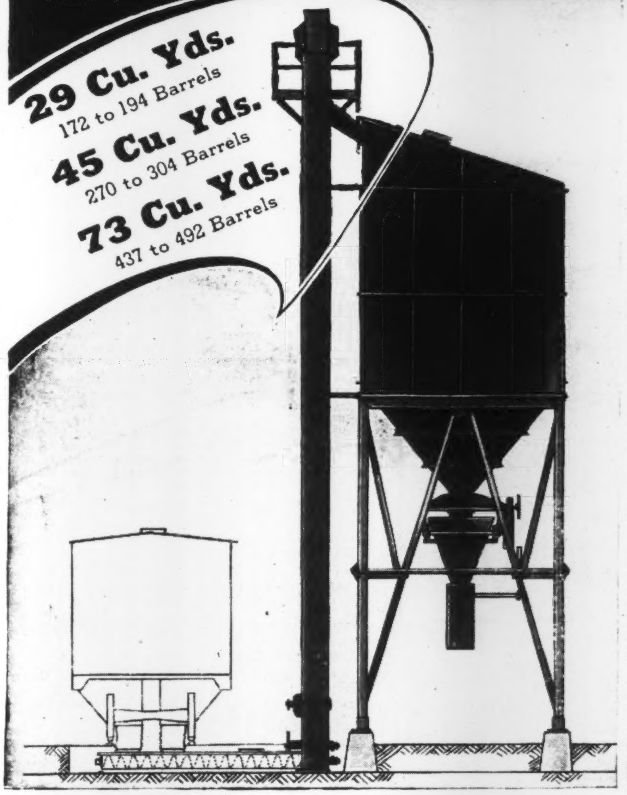

29 Cu. Yds. 172 to 194 Barrels

45 Cu. Yds. 270 to 304 Barrels

73 Cu. Yds. 437 to 492 Barrels

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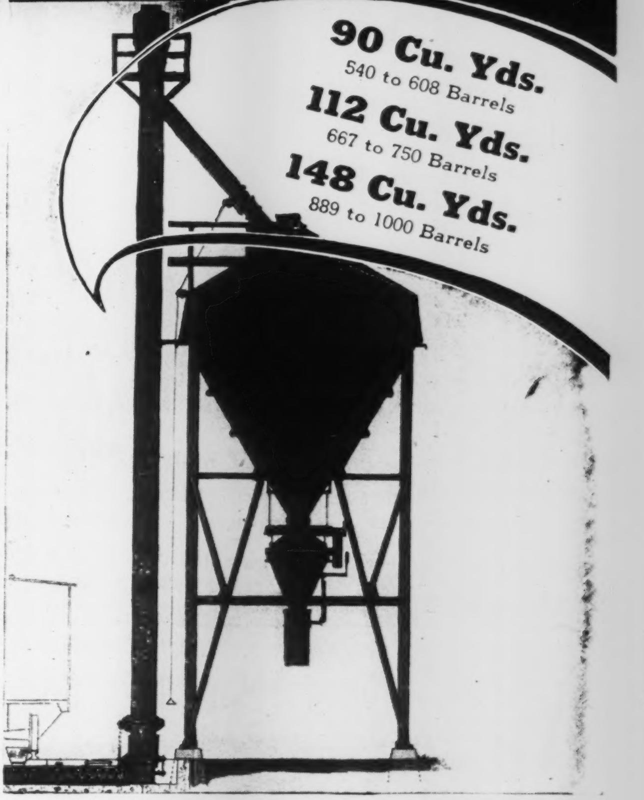

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112 Cu. Yds. 667 to 750 Barrels

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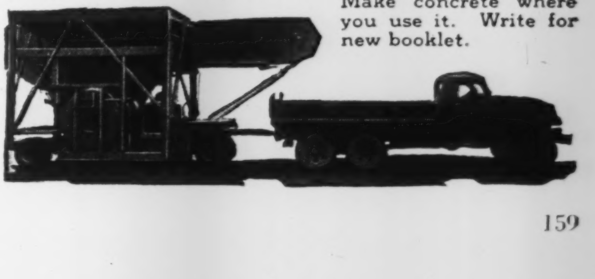

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EARTHWORK, WATERWAYS (Bids Asked Cont'd.)

Bids Asked July 14

†Tennessee, Arkansas and Mississippi—U. S. Eng., P. O. Box 97, Memphis, Zone 1, placing approx. 15,000 squares bank paving under Parcel I between Memphis, Tenn. (Mile 7[illegible] AHP) and Helena, Ark. (Mile 660 AHP) and approx. 21,000 qsuares bank paving under Parcel II between Delta, Miss. (Mile 652 AHP) and mouth of White River (Mile 583 AHP), Serial No. Eng.-4-041-48-177.

†Tennessee and Missouri—U. S. Eng., P. O. Box 96, Memphis, Zone 1, Tenn., 5,300 squares of 10 in. riprap pavement of previously graded banks of Mississippi River, Item 1, approx. 2,500 squares paving at Bend of Island No. [illegible] Tennessee (Mile 862 AHP), on left bank of river, approx. 2 mi. west of Ridgely, Tenn. Item 2, approx. 2,800 squares paving, upstream from Island No. 18 Missouri (Mile 838 AHP) on right bank of river, approx. 5 mi. south of Caruthersville, Mo. Serial No. Eng-4[illegible]-48-180.

Bids Asked July 15

†Arizona-California-Nevada — Bureau Reclamation, Dpt. Interior, Bldg. 1A, Denver Federal Center, Denver, Colo., furnishing, del. f.o.b. cars shipping point or f.o.b. cars Mecca, Calif., one 30 in. diam. cast-iron gate and hoist, etc., for Coachella Valley Distr. Sys. lateral 97.1, station 377/50.11, All-American Canal Sys., Boulder Canyon Project, Spec. 2292. Plans deposit $1. Walker R. Young, ch. engr.

†Washington—Bureau Reclamation, Dpt. Interior, Building 1-A, Denver Federal Center, Denver, Colo., furnishing, del. f.o.b. cars shipping point, f.o.b. cars Odair, 10 lower tier logs; 8 second-tier logs, 5 third-tier logs and 3 top tier logs, etc., and one lifting frame for Grand Coulee Dam, Columbia Basin Project, Spec. 2288. Plans deposit $1.50.

†Wyoming — Bureau Reclamation, Dpt. Interior, Building 1-A, Denver Federal Center, Denver, Colo., furnishing, del. f.o.b. cars shipping point or f.o.b. cars Bonneville, 4 air compressors, rotary high speed, air-cooled, sliding multivane type; direct connected to electric motors through flexible couplings and mounted on rigid bases at integral units, each compressor to be furnished with suction air cleaner, silencer, automatic air unloading valve and automatic oil supply, for outlet works at Boysen Dam, Boysen Unit, Spec. 2294. Plans deposit $1.

Bids Asked July 20

†Oregon and Washington—U. S. Eng., 628 Pittock Block, Portland, Zone 5, Ore., furnishing 1,320,000 tons concrete aggregate for McNary Dam, Serial No. Eng-35-026-48-839. Extended date.

LOW BIDDERS

†Arkansas—U. S. Eng., 300 Broadway, Little Rock, rejected bids May 12, Item 5, erosion repairs on Arkansas River Drainage Dist., Yell Co., Eng. 03-050-48-91.

†Louisiana—U. S. Eng., foot of Prytania St., New Orleans, June 10, approx. 1,060,000 cu. yd. excav., 10.94 mi. clearing, snagging, etc. Bayou Pierre Chanel imprvs., Serial No. Eng. 16-047-48-426, from Pioneer Constr. Co., Shreveport. **$139,625.** CD 5/17—ENR 5/20.

La., Franklin—St. Mary Parish Police Jury, Courthouse, Franklin, rejected bids June 9, drainage proj., 965,000 cu. yd. excav., 315.3 mi. clearing, grubbing, etc. CD 5/19—ENR 5/27.

●†Kentucky—U. S. Eng., 830 W. Broadway, Louisville, June 16, local levee and wall protection, Sect. 1, Covington, Serial No. W-15-029-eng-48-179, from Terry & Steadman Co., 511 Center Box 215, Bay City, Mich. **$1,183,016.** Est. $1,150,280. CD 6/1—ENR 6/3.

†Missouri—U. S. Eng., 601 Davidson Bldg., Kansas City, 8, Mo., June 16, Levee Unit 448-443-L, Part I, left bank Missouri River, south of St. Joseph, Buchanan Co., Serial No. Eng.-23-028-48-302, from George Bennett Constr. Co., 1520 Central Ave., Kansas City, Kan., **$435,167.** Est. $491,914. CD 5/24—ENR 5/27.

CONTRACTS AWARDED

†Arizona-Nevada — Bureau Reclamation, Dpt. Interior, Bldg. 1A, Denver Federal Center, Denver, Colo., stubs, anchor bolts and steel structures for Parker switchyard exten., Davis Dam Proj., Spec. 2144, to Allison Steel Mfg. Co., S. 19 Ave., Phoenix, Ariz. **$56,513,** f.o.b. Earp, Calif. Bids 5/13, awarded 6/7. CD 5/24—ENR 5/27, under LB.

†North Carolina—U. S. Eng., 308 Customhouse, Wilmington, dredging Manteo (Shallowbag) Bay, Inv. No. Eng-31-075-48-60, to J. A. Laporte, Arlington, Va. **$35,341.** Bids 5/25. CD 5/12—ENR 5/20.

Ont., Port Hope—Dpt. P. Wks., Ottawa, Ont., dredging, to Russell Constr. Co., Ltd., 501 Harbour Commission Bldg., Toronto. About **$36,500.** CD 12/17—ENR 12/25.

AIRPORTS AND AIRBASES

BIDS ASKED

Bids Asked June 28

Vt., Burlington—AIRPORT—City, Lester W. Greene, chn., Burlington Airport Comn., administration bldg., appurtenances; constructing loading apron, access road and extens. of northwest and southeast runway and appur- South Burlington. Plans deposit $25 each. Fay Spofford & Thorndike, 11 Beacon St., Boston, Mass., engrs. CD 2/21/47—ENR 3/3/47.

AIRPORTS AND AIRBASES (Low Bidders. Cont'd.)

Bids Asked June 30

N. B., Fredericton—AIRPORT IMPRVS.—F. T. Collins, secy. Dpt. Transport, Ottawa, Ont., clearing, stumping, grading, open ditches for developing local airport. Approx. $75,000. Plans deposit $10. CD 6/27/45—ENR 7/5/45.

Bids Asked July 1

N. Y., Sayville—ADMINISTRATION BLDG.—Town Clerk, Town Hall, Montauk Hy., Islip, administration bldg. at McArthur Airport. $90,000. Plans deposit $25. Robert H. Edwards, 22 Main St., archt.

LOW BIDDERS

●**Ga., Atlanta**—AIRPORT—City, June 14, municipal airport imprvs., Part 1, Alternate A, from H. E. Wolfe Constr. Co., St. Augustine, **$1,039,888;** Alternates B and C, from MacDougald Constr. Co., Northside Dr., Atlanta, **$1,006,-740** and **$1,121,584** respectively; Part 2, electrical work, from Harrison-Wright Co., 119 W. 3 St., Charlotte, N. C., **$63,834.** CD 5/28—ENR 6/3.

†**N. Y., Brooklyn**—HANGARS—U. S. Eng., 120 Wall St., New York, Zone 5, rejected bids May 27, Hangar Alterations 9 and 10 at Floyd Bennett Field. CD 5/19.

†**Ore., Rome (P. O. Arcata)** — LIVING QUARTERS, etc.—Civil Aeronautics Admin., P. O. Box 3224, Seattle, Wash., May 1, living quarters, airway communication station and VHF radio range, from City Electric Co., Box 1277, Boise, Idaho. **$62,000.** CD 5/4—ENR 5/6.

†**Pa., Reading**—APRON—U. S. Eng., 1 and Douglas Sts. N.W., Wash., D. C., concrete apron at Reading Municipal Airport, Serial No. 49-080-48-98 (33) M, from McMinn Industries, Inc., Lancaster. **$228,465.** CD 5/21—ENR 5/27.

Tex., College Station—AIRPORT—A. & M. College of Texas, College Station, airport grading, paving, lighting, etc., from W. E. Kutzschbach, Bryan. **$49,583.** C. K. Leighton, c/o owner, constr. engr. CD 1/16/46—ENR 2/7/46.

CONTRACTS AWARDED

Mass., New Bedford—HANGAR—E. Anthony & Sons, Inc., 555 Pleasant St., 1 story, 50 x 90 ft. hangar addn., to Walter H. Barker, Inc., 23 Main St., Taunton. Est. **$55,000.** CD 4/21—ENR 4/29.

†**T. H., Oahu**—GYMNASIUM and BOWLING ALLEY—U. S. Eng., P. O. Box 2240, Fort Armstrong, Honolulu, gymnasium and bowling alley bldg. at Hickam Field, Island of Oahu, Inv. No. Eng.-00-002-48-25, to Walker-Moody Constr. Co., Ltd., Honolulu. **$357,700.** Bids 4/30. CD 4/7—ENR 4/15.

LATIN AMERICA

Mexico, Nuevo Laredo—Union Ganadera Regional de Nuevo Laredo, (Regional Cattle Raisers Assn.), Nuevo Laredo, receiving bids, fresh beef packing and canning plant. $400,000. Augusto Samano, Nacional Financieram, Mexico City, engrs.

Venezuela—State of Bolivar, Conj. National Education Ministry, receives bids in July dining rooms for schools in rural areas. $250,000.

Venezuela, Barquisimeto—City, receives bids in August artificial beach, incl. playgrounds, bathhouses, concessions. $750,000.

Argentina, Buenos Aires—Instituto Argentino de Bromocion del Intercambio, Buenos Aires, receiving bids 50 warehouses.

Venezuela—States of Sucre and Monagas, conjunction Ministry Pub. Wks., repairing, constructing road between Carupano and Caripito, own forces. **$200,000.**

Venezuela, LaGuaneta — State of Monagas, (conjunction Ministry Pub. Wks., Dr. E. Pardo Stolk, minister), constructing and repairing roads near Sabana de Piedra and LaGuaneta, own forces. **$150,000.**

Venezuela, Maracaibo — National Ministry Sanitation & Health, Conj. Pub. Wks. Ministry, receives bids within 3 months nurses home near Hospital Quirurgico. $400,000.

Venezuela, Maracaibo—City, Luis Vera, pres. City Council, bids within 90 days, paving, repairs, new construction 3 roads, Valles, Frios, Bella Vista and La Pomona. $700,000.

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LATIN AMERICA (Cont'd.)

Venezuela, Maturin—City, paving, repairing, constructing to principal avenue, Bolivar, own forces. **$125,000.**

Venezuela, Valencia—State of Curabobo, in conjunction Minstry Pub. Wks., Dr. E. [illegible] Stolk, constructing minister, road repairs, avenues Michelena and Branger, own forces. **$120,000.**

PUBLIC BUILDINGS

BIDS ASKED

Bids Asked June 28

†N. Y., Brooklyn—Pub. Wks. Office, Naval Shipyard, Bldg. 295 alterations. Plans deposit $10. Extended date. CD 5/26—ENR 6/3.

Bids Asked June 29

Mo., Lamar—County Court of Barton Co., F. A. Lee, presiding judge, and Bd. Hospital Trustees Memorial Hospital, H. C. Chancellor, chn., Lamar, 2 story, bsmnt., 45 x 110 ft. and 20 x 32 ft. wing, concrete, brick, stone, Barton County Memorial Hospital, Gulf St., north of Second St. $250,000. Plans deposit $25. D. R. Sandford & Sons, 325 Woodruff Bldg., Springfield, archts. CD 9/17—ENR 9/25.

N. Y., New York—Dpt. P. Wks., Municipal Bldg., Zone 7, altering bldgs. of Park Avenue Market, Park Ave. between E. 111 and E. 116 Sts., under New York Central tracks, Manhattan Boro. Plans deposit $5.

●Pa., Phila.—Bd. Educ., 21 and Winter Sts., Senior High School, Ryan and Rowland Aves. and Shelmire and Duffield Sts. Office of Edward P. Simon, 123 S. Broad St., archt. Thomas J. McCormick, 123 S. Broad St., engr. CD 1/24/47—ENR 2/6/47.

Bids Asked June 30

†O., Cleveland—Yards & Docks, Great Lakes, Ill., erecting four 40x100 ft. quonset type bldgs., incl. fdns., entrances and extensive interior work, at Naval Reserve Training Center. $200,000.

†Wis., Madison—Ninth Naval Dist., Great Lakes, Ill., Naval Reserve Training Center.

Bids Asked July 1

Calif., Hayward — Hayward School Dist., 1099 E. St., 1 story, stucco Ward St. School 30,000 sq. ft. floor space. $340,000. Plans deposit $25. Anderson & Simonds, 2800 Park Blvd., Oakland, archts. CD 3/24—ENR 4/15.

Bids Asked July 2

Connecticut — State Dpt. Hys., State Office Bldg., Hartford, eight 1 story, 22x24 ft. brick, slate, service stations, one on each side of Wilbur Cross Parkway, incl. refuse house, sewage disposal, comfort stations, etc., Orange, North Haven, Meriden and East Hartford. $400,000. F. J. Dixon, 952 Main St., Bridgeport, archt. CD 2/19—ENR 3/4.

Bids Asked July 5

Pa., Uniontown—Bd. Educ., North Union Twp., Uniontown, 1 story, bsmnt., steel deck roof constr. brick high school addn. Coolspring St. $300,000. Altman & Altman, 206 Derrick Ave., archts. CD 3/18—ENR 4/1.

Tex., Amarillo — Amarillo Junior College, Amarillo, Junior College. $250,000. Guy A. Carlander, P.O. Box 3158, archt. Extended date. CD 6/8.

Bids Asked July 6

Conn., Cromwell — Town, Wm. K. Buggie, chn. Building comn., 2 story, bsmnt., brick, steel Memorial Town Hall. Sebastian J. Passanesi, 164 Court St., Middletown, archt.

†Washington—Bureau Reclamation, Dpt. Interior, Building 1-A, Denver Federal Center, Denver, Colo., misc. structural steel for Units RS to R9, Grand Coulee Powerplant, Spec. 2287. Plans deposit $1.

Bids Asked July 7

Ill., Urbana—University of Illinois, Urbana, four 3 and 6 story, brick faculty housing bldgs., Skidmore, Owings & Merrill, 100 W. Monroe St., Chicago, archts.

Ind., Indianapolis—Bd. Trustees Indiana University, J. A. Franklin, treas., Administration Bldg., Bloomington, 1 story, bsmt., 70 x 80 ft., brick, stone, rein.-con. X-Ray hospital addn., at Medical Center, W. Michigan St. $500,000. D. A. Bohlen & Son, 930 State Life Bldg., archts. CD 3/27—ENR 4/17.

Bids Asked July 8

†Kansas — Bureau Reclamation, Dpt. Interior, New Customhouse, Region 7, Denver, Colo., 14 two bedroom and 6 three bedroom houses for government housing, Ellis, Cedar Bluff Unit, Missouri Basin Proj., Spec. No. VII-20. Plans deposit $2. Extend date.

New York—Triborough Bridge and Tunnel Auth., Administration Bldg., Randalls Island, New York, Zone 35, Administration Bldg., alterations, addns., parking field, and boiler house, Henry Hudson Bridge, Contr. HM-2.

N. Y., Canisteo—Bd. Educ., Central School Dist. 1, Canisteo, school addn. Plans deposit $15. Raymond Freeburg, 1105 W. Third St., Jamestown, archt. ENR 12/6/45.

●N. Y., Ithaca—Supt. Grounds & Bldgs., Administration Bldg., Cornell University, 2 college bldgs. $1,300,000. Extended date. CD 6/14—ENR 6/17.

BLIC BUILDINGS (Bids Asked, Cont'd.)

O., Akron — Bd. Educ., Northampton Local School Dist., Summit Co., Mrs. Irene A. Holland, clk., Box 368, R.D. 2, Cuyahoga Falls, Northhampton School addn. W. B. Huff, 1050 Main St., Akron, Zone 10, archt. CD 1/15/45—ENR 1/3/46.

O., Painesville — Painesville Local School Dist., Lake County Courthouse, 2 story, 45x350 ft., brick, rein.-con. high school; 1 story, 40x60 ft. boiler-coal room bldg. $700,000. Harry A. Fulton, 6014 Euclid St., Cleveland, archt. CD 9/46—ENR 7/18/46.

Ont., Fort William—McIntosh & Mickelson & Assoc., archts., 118 S. Syndicate Ave., 165x75 ft. with 40x130 ft. lobby annex community centre, incl. 90x180 ft. curling rink annex, both structural steel, concrete, brick front, for City. Approx. $700,000. M. Macleman, c/o Owner, engr.

Wash., Seattle—University of Washington, Education Hall, Zone 5, 2 story, steel, masonry, on piling fdn. shell house of U. W. crews. $350,000. J. P. Jones & L. W. Bindon, Hoge Bldg., Zone 4, archts. CD 4/15/47—ENR 5/1/47.

Bids Asked July 14

Conn., Storrs — SWIMMING POOL — State, F. R. Zeller, State Capitol, Hartford, brick, steel, concrete, gymnasium, swimming pool, on University of Conn. Campus. $625,000. Fred C. Teich, 252 Asylum St., Hartford, archt. CD 4/7—ENR 4/27.

Mass., Pittsfield—At office Supt. P. Bldgs., City Hall, Wilson Park Housing, incl. 8 apartments, streets, watermains, sewers, etc. Plans deposit $25, $20 refundable. Keis Holroyd, 257 Broadway, Troy, N. Y. engr.; adv. ENR 6/24. CD 4/22—ENR 5/13.

•Md., Annapolis—Bd. Educ., Anne Arundel Co., Annapolis, 2 story, brick, steel, cinder block Bates High School addn. $1,250,000. Plans deposit $100. **Buckler, Fenhagen, Myers** & Ayers, 325 N. Charles St., archts. CD 9/25—ENR 10/16.

Bids Asked July 15

Calif., Los Angeles—State Div. Hys., State Bldg., Los Angeles, warehouse, near intersection of Lanzit and Central Aves., G. T. McCoy, Sacramento, hy. engr.

Ia., Marion — Independent School Dist., school, Norman Hatton, Higley Bldg., Cedar Rapids, archt.

†Idaho—Bureau Reclamation, Dpt. Interior, Bldg. 1-A, Denver Federal Center, Denver, Colo., furnishing, del. f.o.b. cars shipping point or f.o.b. cars Letha, radial gate, with pin roller beariigs, wall plate, gate sill, etc. Black Canyon Canal, Sta. 1066 plus 09. Boise Proj., Spec. 2298. Plans deposit $2.25. Walker R. Young, Denver, ch. engr.

Tenn., Union City—Corp. of Union City, J. M. Sedberry, mayor—comr., Miles Junior High School alterations, addns., and appurtenant work, Westover School alterations, addns. Plans deposit $10. Raymond B. Spencer & Assoc., 1st Natl. Bank Bldg., Memphis, archt. Russell & Axon, 408 Olive St. St. Louis 2, Mo., engrs. CD 7/17/47—ENR 8/7/47.

Bids Asked July 19

†Calif., Merced—Bureau Reclamation, Dpt. Interior, Box 1270, 18 prefabricated residences, streets, sidewalks, water distr. and sewerage sys. for Govt. housing of Reclamation Bureau workers, Spec. R2-23.

Bids Asked About July 30

Ont., Ingersoll—Ingersoll Hospital Bd., Ingersoll, 3 story, 50 x 155 ft., brick, steel hospital. $375,000. L. G. Bridgeman, Royal Bank Bldg., London, archt. CD 2/5—ENR **2/20.**

Bids Asked

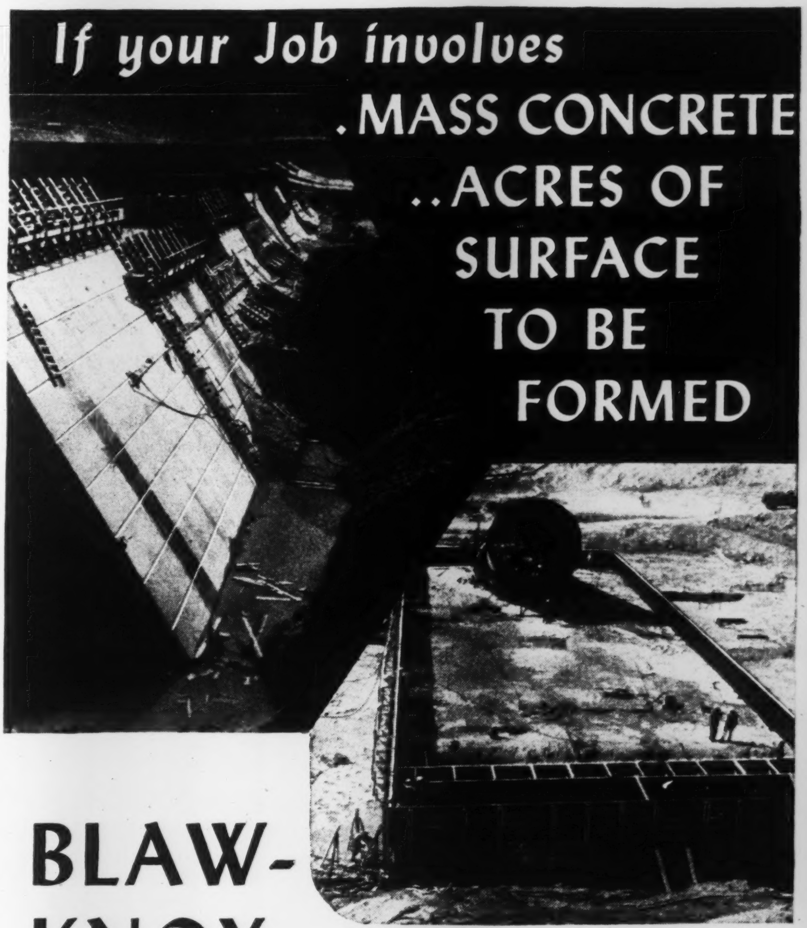
†Pa., Sellersville—U. S. Govt. Property & Disbursing Office, Indiantown Gap Military Reservation, Annville, motor vehicle storage bldg. Over $70,000.

LOW BIDDERS

Calif., San Mateo—San Mateo Co., Courthouse, Redwood City, June 15, 200x320 ft. concrete block, ornamental concrete exterior main fiesta bldg., from Biltwell Constr. Co., 4745 Geary Blvd., San Francisco. **$237,777.** CD 6/11—ENR 6/17.

Calif., Sacramento—Robla School Dist., Sacramento Co., June 10, c/o Geo. C. Sellon, archt., California State Life Bldg., frame stucco Robla School, from Holdener Constr. Co., 2608 R. St. **$292,125.** CD 5/21—ENR 5/27.

•Conn., Mansfield—Comptroller's Office, 114 State Capitol, Hartford, June 15, school at Mansfield Training School, from A. E. Stephens Co., 1200 Main St., Springfield, Mass. **$2,227,700.** CD 5/18—ENR 5/20.



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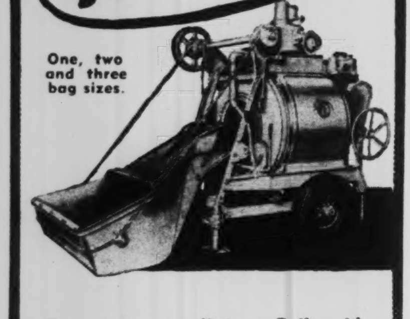

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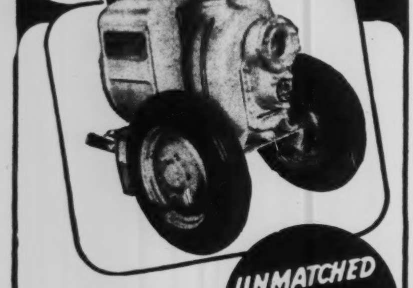

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PUBLIC BLDGS. (Low Bidders, Cont'd.)

Conn., Norwich—City Housing Authority, 242 Main St., Irving Spiro, chn., May 18, 50 dwelling units, New London Turnpike, from Edward Niederman, Gales Ferry. **$389,745.** CD 5/17—ENR 5/20.

Fla., Dade City—Pasco Co., Bd. P. Instruction, Dade City, June 3, high school, from Paul Smith Constr. Co., 310 N. Rome Ave., Tampa. **$396,313.** CD 6/4—ENR 6/10.

Ind., Muncie—Ball State Teachers College, Dr. J. R. Emens, pres., June 10, 3 story, brick, stone, rein.-con., structural steel Industrial Arts Bldg., from R. E. Schenck Co., 1538 N. Meridian St., Indianapolis. **$377,246.** CD 5/20—ENR 5/27.

●N. Y., New York—New York City Housing Auth., 122 E. 42 St., Zone 17, furnishing, erecting structural steel for Bldgs. 1 to 7 (inclusive) of the Governor Alfred E. Smith Houses Proj. No. NYS-25, bounded by Madison St., Catherine St., Catherine Slip, South St., Pearl St. and New Bowery, from Bethlehem Steel Co., 25 Broadway, Zone 4. **$1,625,000.** CD 6/1—ENR 6/3.

Pa., West Chester—Comrs., Chester Co., Courthouse, Home for Indigent Poor from Progressive Builders, Inc., 315 Market St., Camden, N. J. **$942,000.** CD 5/20—ENR 5/27.

S. C., Clinton—Bd. Regents S. C. State Hospital, Columbia, 2 dormitories and attendants home, from C. G. Shockley Constr. Co., 202 Blanding St., Columbia. **$270,710.**

†Wash., Spokane—Pub. Wks. Office, 13th Naval Dist., U. S. Naval Receiving Station, Seattle, altering, repairing 8 frame bldgs., constructing 43 x 71 ft. small arms range and garage bldg., etc., for Naval and Marine Corps Reserve Training Center for Yards & Docks Annex, Navy Dpt., Arlington, Va., from Roy L. Bair Co., 1220 Ide St. **$307,851.** CD 5/20—ENR 5/27.

B. C., Kimberley—Trustees School Dist., 3, Kimberley, May 20, 16 classroom school and 10 classroom high school, from Dawson & Hall, Ltd., 775 Clark Dr., Vancouver. **$638,558.** CD 4/21.

CONTRACTS AWARDED

Ark., Pine Bluff—Bd. Educ., Pine Bluff, general contract 2 brick concrete schools, First Ward and Indiana St. Schools for Pine Bluff School Dist. to Chas. Quinn, 1319 W. 5 Ave. **$322,362.** Bids 6/8 CD 5/24—ENR 5/27.

●Calif., Imola — State Div. Architecture, P. Wks. Bldg., Sacramento, general contract Units 2 and 3, South Ward Group of Napa State Hospital, to Moore & Roberts, 696 Mission St., San Francisco. **$1,767,777.** Bids 6/8. CD 6/14—ENR 6/17, under LB.

Conn., Willimantic — Town of Windham, Bd. Educ., Windham High School, to A. E. Stephen Co., 78 High St. **$667,900.** Bids 3/4. CD 3/17—ENR 3/29.

Fla., Chattahoochee—State Imprvt. Comn., Tallahassee, heating plant for Institution for Feeble Minded Children, to Henry G. Dupree, 1102 Alvarez St., Jacksonville. **$117,443.** Guy C. Fulton Assoc., Tallahassee, archts.

Ill., Herrin—Herrin Township School Dist., Z. C. Eckert, principal, Herrin, bridge, concrete, steel, stone school. Owner builds. Approx. **$450,000.** CD 2/27—ENR 3/18.

Neb., Schuyler—City, boiler bldg., addn., etc., to Ryan Constr. Co., 2605 Taylor St., Omaha. **$75,000.** Bids 5/11. CD 5/26.

●†N. M., Albuquerque — U. S. Eng., Commercial Bldg., 152 frame, stucco housing units, utilities, incl. gas, water, sewer and electric distr. and street lighting, etc. Sandia Base, Serial No. W-29-005-eng-48-27, to Haddock Engineers Ltd., Box 429, Oceanside, Calif., Lot I. **$1,545,997.** Bids 1/19. CD 1/22—ENR 1/29.

●N. Y., Woodside—New York City Housing Auth., 122 E. 42 St., New York 17, general contract Woodside Houses Proj. (NYC-5), area bounded by Newton Rd., 31 Ave. 49 and 51 Sts. and Northern Blvd., to George F. Driscoll, Inc., 41 E. 42 St., New York, Zone 17, **$7,843,784*****heating and ventilating to J. L. Murphy, Inc., 340 E. 44 St., New York, Zone 17. **$987,000*****plumbing, to Novak & Rehner, Inc., 623 10 Ave., New York, Zone 19. **$1,134,700.** Grand total $9,965,484. Bids 5/20. CD 5/24—ENR 5/27, under LB.

†North Dakota—U. S. Eng., P. O. Box 300, Fort Lincoln, 115 kv substation and 12.5 kv distr. sys. Garrison Dam and Reservoir, Riverdale, Inv. No. Eng-32-015-48-96, to Commonwealth Electric Co., 126 N. 11 St., Lincoln, Neb. **$117,020.** Bids about 5/11. CD 4/7—ENR 4/15.

†R. I., Newport—Pub. Wks. Dpt., Naval Air Base, Newport, powerplant repairs and reconstruction, Naval Training Station, to Bennett Stewart Co., Inc., 105 Newbury St., Boston, Mass. **$171,906.** CD 2/16—ENR 2/26.

Ont., Tilbury — Tilbury Dist. High School Bd., D. M. MacPherson, chn., Tilbury, 1 story 14-classroom school, to W. B. Sullivan Constr. Ltd., 30 Bloor St. W., Toronto. Approx. **$372,594.** Bids 3/31. CD 5/19—ENR 5/27.

COMMERCIAL BUILDINGS

BIDS ASKED

Bids Asked June 28

N. Y., Yonkers—Neustarter Home, Central Ave. and McLean Ave., (selected list bidders), convalescent home addn. $350,000. Kahn & Jacobs, 2 Park Ave., New York, archts.

Bids Asked June 29

S. C., Columbia — Crescent Hill Baptist Church, c/o Fleming & Guerard, archts., 813 Harden St., educational bldg.

Bids Asked June 30

Ont., Pembroke—W. E. Noffke, archt., 46 Elgin St., Ottawa, heating plant for hospital constr. program, McKay St., for Grey Sisters of the Immaculate Conception, Pembroke. Approx. $100,000. CD 8/21—ENR 8/28.

Bids Asked About July 1

Pa., Allentown—Maurice Courtland & Son, archts., 2 W. 89 St., New York, N. Y., synagogue for Temple Beth El, Rabbi J. Leonard Azneer, 211 S. St. Cloud St. $250,000. CD 3/25—ENR 4/1.

Bids Asked July 2

Calif., Los Angeles—Institute of Aeronautical Sciences, 6715 Hollywood Blvd. (selected list bidders) 1 story, part 2 story, bsmnt., 18,000 sq. ft. masonry bldg., incl. meeting rooms, assembly room, library, conference rooms, air conditioning. Paul E. Jeffers, 816 W. 5 St., engr. H. Roy Kelley, 3723-A Wilshire Blvd., archt. CD 4/7—ENR 4/29.

Bids Asked July 7

●N. Y., Buffalo — Buffalo General Hospital, 100 High St., hospital addn. $4,000,000. Crow, Lewis & Wick, 200 Fifth Ave., New York, archts. Bids 1/23, rejected. CD 1/8—ENR 1/15.

Bids Asked July 14

O., Wilberforce—College of Education & Industrial Arts, Wilberforce, 3 story, bsmnt., irregular shape, brick, stone, rein.-con. science bldg. $375,000. Outcalt & Guenther, 13124 Shaker Square, Cleveland, archts. CD 4/14—ENR 4/24.

Bids Asked

Ill., Chicago—South Side Hebrew Congregation, c/o Friedman, Alschuler & Sincere, archts., 223 W. Jackson St., 3 story, brick, concrete educational bldg.

Tex., Dallas—Texas Bank & Trust Co., 810 Main St., remodeling, altering bank. $250,000. Christenson & Christenson, 709 N. St. Paul St., archts. CD 10/15/47—ENR 10/23/47, under LB.

R. I., East Providence—Zion Gospel Tabernacle, Rev. Christine A. Gibson, pastor, 1 story, bsmnt., mezzanine, 80 x 125 ft., brick steel tabernacle, Gurney St. and Leonard Ave. $250,000. Francis Chiavarini, 39 Westminster St., Providence, archt. CD 3/25 4—ENR 4/8.

SOON LETS CONTRACT

Calif., Fresno—Pacific Telephone & Telegraph Co., 116 New Montgomery St., San Francisco, soon lets contract telephone exchange. Over $250,000. Clarence O. Peterson and Wendell R. Spackman, 45 2 St., San Francisco, archts.

Md., Bethesda — Richards Properties, Inc. J. Richard, Jr., in charge, 503 Bradley Blvd., Chevy Chase, soon lets contract 38 unit 3 story 124x100 ft. brick, cinder block apartment, Leland St., strathmore St. and Wellington Dr. J. T. Thomen, 2209 L St. N.W., Wash., D. C., archt.

Md., Gaithersburg—Asbury Methodist Home for the Aged, Rev. Herman Wilson, supt., Gaithersburg, soon lets contract 3 story, 37 x 72 ft., 25-bed brick, steel wing to Cassell Home, Unit I, Approx. $300,000. James R. Edmunds, Jr., 130 W. Hamilton St., Baltimore, archt. Crout, Snyder & Crandall, 20 E. Lexington St., Baltimore, structural engr. Henry Adams, Inc., 2315 St. Paul St., Baltimore, mechanical engr. CD 56—ENR 5/27.

N. C., Greensboro—Southern Bell Telephone Co., Hurt Bldg., Atlanta, Ga., soon lets contracts toll office bldg. Schutze & Armistead, Candler Bldg., Atlanta, Ga., archts.

O., Oberlin—Oberlin College, Oberlin, soon lets contract two 2 story with English type bsmnt., irregular shape, brick, stone, steel, concrete dormitory addns. for women students. $200,000. Eldredge Snyder, 101 Park Ave., New York, N. Y., archt. CD 4/16—ENR 4/29.

Pa., Pittsburgh—St. Pauls Monastery, Diocese of Pittsburgh, 125 N. Craig St., soon lets contract monastery alterations, addns, Monastery Ave., $350,000. Stickle, Keeley & Stickle, 2412 Prospect Ave., Cleveland, O., archts. CD 3/4—ENR 3/11.

LOW BIDDERS

Calif., Palo Alto—Bd. Regents Stanford University, June 8, four 2 story concrete frame dormitory wings, for Stern Hall, from Wagner & Martinez, 181 S. Park St., San Francisco. **$843,000.** Hall of Pregnoff, 251 Kearny St., San Francisco, engrs. CD 5/25—ENR 5/27.

Calif., San Jose—Insurance Co. of North America, San Jose, June 15, 2 story, part bsmnt., rein.-con. office, Lenzen Ave., from MacDonald, Young, & Nelson, 351 California St., San Francisco. **$498,495.** Wurster, Bernardi & Emmons, 402 Jackson St., San Francisco, archts.

Md., Hyattsville—Holy Trinity Fathers, 4310 Madison St., June 14, 2 story, 6 classroom high school, from Parkhill Constr. Co., 1427 I St. N.W., Wash., D. C. **$434,300.** CD 6/8—ENR 6/10.

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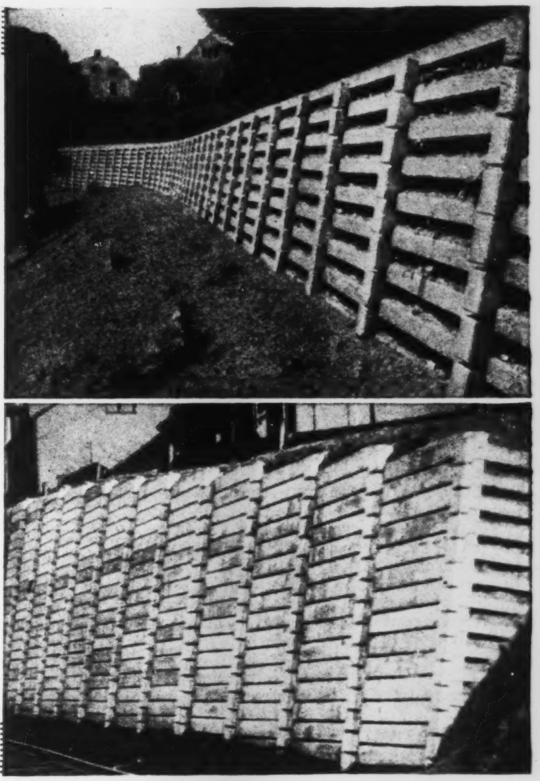

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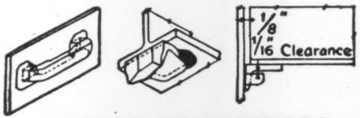

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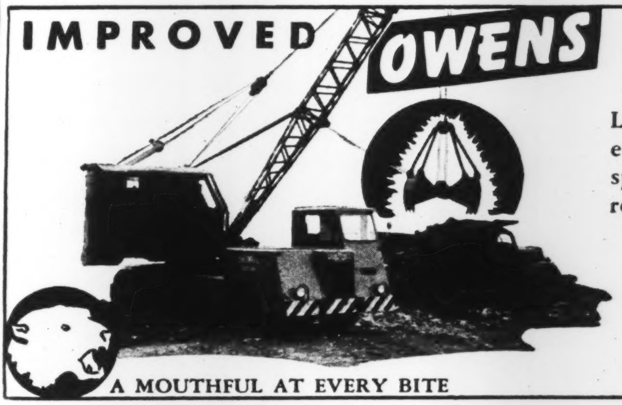

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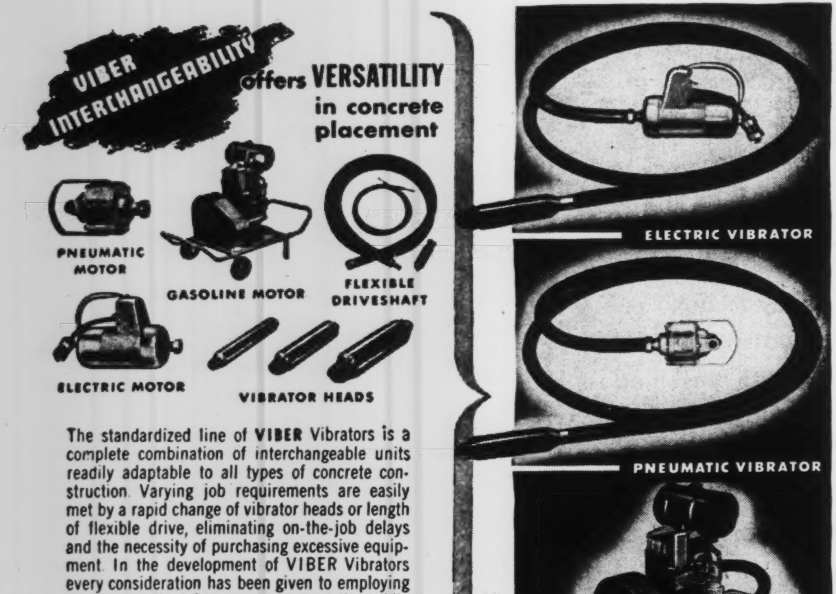

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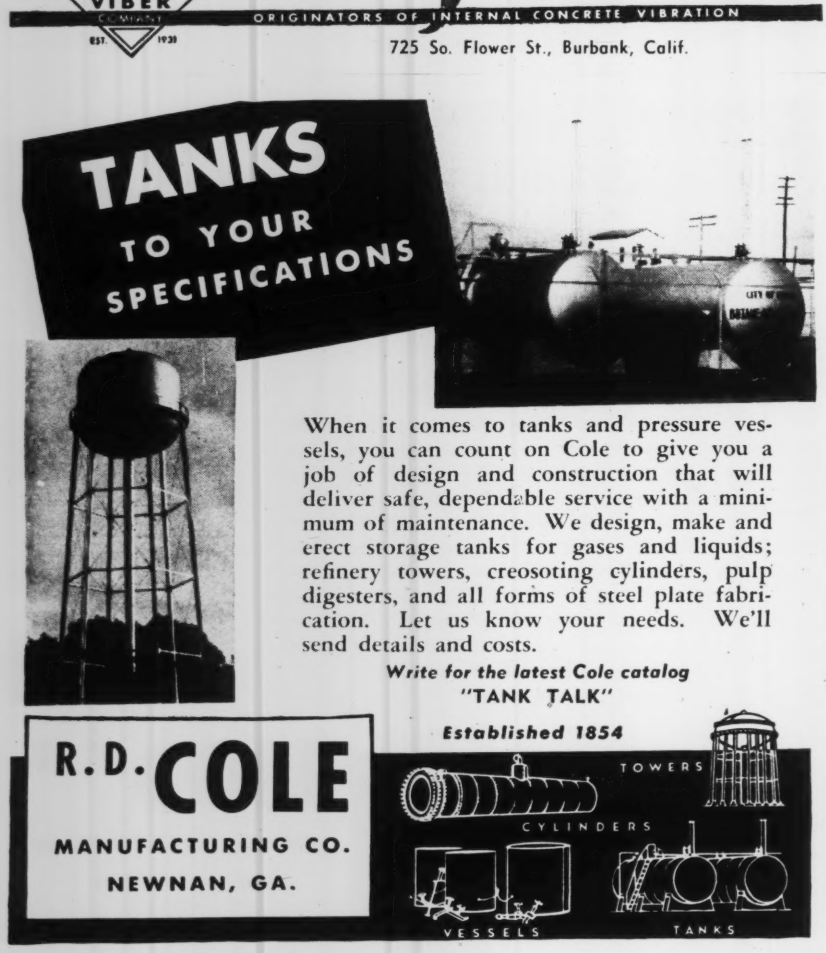

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COMMERCIAL BUILDINGS (Low Cont'd.)

N. Y., New York—Young Women's Assn. of New York City, 129 E. 52 22, project deferred until Fall, Y. W. and school, 204 E. 77 St. **$600,000.** ENR 5/13.

W. Va., Martinsburg — Chesapeak tomac Telephone Co., 816 Lee St., 2 story, bsmnt., 66x82 ft. brick, concrete frame on steel telephone Burke and Spring Sts., from Dick Co., 2532 Library Rd., Pittsburgh, **$270,000.** CD 12/1—ENR 12/11.

Wis., Port Edwards — Nekoosa Paper Co., Port Edwards, 1 story, 70 steel, brick, concrete block shopping concrete fdn., from F. J. Henry, 11 St., Wisconsin Rapids. CD 5/11—ENR 13.

CONTRACTS AWARDED

Calif., San Leandro—Allen E. Pel 1368 148 Ave., wood frame shopping to Plymouth Constr. Co., 297 Financial Building., Oakland. Est. $350,000. Howard Sweeting, 566 Commercial St., San Francisco, archt.

●**Calif., San Mateo**—David D. Bohannon Organization, 859 San Mateo Dr., 30 stucco, brick veneer apartments, 502 units Hillsdale, Subdivision 5. Owner builds **$1,701,194.** CD 4/29—ENR 5/13.

Calif., Santa Rosa—Sears, Roebuck & Co., 2650 E. Olympic Blvd., Los Angeles, 1 story, bsmnt., mezzanine structural steel store, Wm. D. Rapp, 705 Bennett Ave. Est. approx. **$700,000.** Bids 6.2. Clarence Caulkins, Jr., Rosenberg Bldg., archt. CD 6/9—ENR 6/17.

Conn., Norwich—Isadore & S. 17 Broad St., 1 story, mezzanine, brick, steel, concrete theater, Main Berkman Bros. Constr. Co., 17 Broad Est. **$250,000.** Bids 4/26. CD 4/14—ENR 4

Fla., Fort Lauderdale—Blue Water Hotel Co., c/o contractor, hotel, to Richardson Constr. Co., 2937 E. Las Olas Blvd. Est. over **$300,000.**

Fla., Miami—The Mackle Co., Inc. 21 S.W. 22 St., 67 homes. Owner builds. **$585,000.**

Fla., North Miami—Marric Builders, Inc., 2128 S.W. 22 St., Miami, 52 homes. Owner builds. **$650,000.**

Fla., North Miami—Marricc Builders, Inc., c/o Lester Avery, 123 N.W. 12 Ave., Miami, 60 homes. Owner builds. Over **$350,000.**

Fla., St. Petersburg—Alex Hagers, 4 St. N., 32 apartment units. Owner builds. **$278,000.**

Fla., St. Petersburg—Eden Homes Inc., c/o Chester O. Bosworth, Bethwood Terrace, or more homes. Owner builds. Over **$300,000.**

Ga., Columbus — Jordon Contracting Co., Andrews Rd., 52-unit apartment, Wynnton Rd., own forces. Est. **$500,000.**

Ind., Seymour — Lutheran Church, H. C. Ahlbrand, chn., Seymour, 2 story, bsmnt., 105x125 ft., brick, stone, rein.-con., structural steel parochial school, to W. J. Abrahams & Sons, Seymour. Est. **$250,000.** Awarded 6/1 CD 3/24—ENR 4/8.

Ind., Whiting—St. John the Baptist R. C. Church, Rev. Fr. Jus. Lefko, Whiting, story, bsmnt., 68 x 180 ft., brick, school Lincoln St. near 119 St., to Roy C. Clark 804 E. Chicago St., East Chicago. **$700,000** Awarded 6/11. CD 5/20—ENR 6/6.

Md., Baltimore — Henry J. Adler, 120 Ocala Ave., 39 two story, bsmnt., 20x30 ft. block residences, Wabash Ave., separate contracts. **$500,000.** James Cox, 228 Linden Ave., Towson, archt.

●**Md., Silver Spring**—Samuel Eig, 5416 Georgia Ave. N.W., Wash. D. C., general contract 1 story theater seating 1,000 persons, shopping center, incl. 25 stores, at Rock Creek Hills on East West Hy., to Wheeler Eng. Co., 864 Colesville Rd. **$1,000,000.** CD 4/17/46—ENR 4/25/46.

Mo., Independence—Katz Drug Co., c/o Earl S. Katz, 12 and Walnut Sts., Kansas City, Mo., remodeling, modernizing 2 story, bsmnt., 60 x 160 ft., brick, concrete drug store, incl. 1 story, bsmnt., 60 x 164 ft. addn., Main and Maple Sts., to Flett Constr. Co., 4325 Troost Ave., Kansas City, Mo. Approx. **$300,000.** Clarence Kivett & Ralph E. Myers, 1016 Baltimore Ave., Kansas City 6, Mo., archts.

●**N. Y., New York**—Metropolitan Life Insurance Co., 1 Madison Ave., Zone 10, 19 story store and office bldg., 5 Ave. and 51 St., to Starrett Bros. & Eken, 63 Wall St.; steel, to American Bridge Co., 71 Broadway. Est. **$10,000,000.** CD 12/18/46—ENR 1/1/47.

N. Y., St. Albans — Natland Realty Corp., Albert Schlefer, pres., 66 Court St., Brooklyn, Zone 2, Linden Gardens Apartment Project, Springfield Blvd. and 116 Ave. Owner builds. Est. **$300,000.** Albert B. Schaefer, c/o owner, archt.

N. J., Princeton — Hights Custom Built Homes, Inc., Box 181, Hightstown, 40 residences, Snowden Lane, separate contracts. **$350,000.**

Pa., Bristol—Leister & Leister, Bridgewater, residential development, Glen Ashton Farms, separate contracts. **$260,000.** Raymond Viner Hall, Port Alleghany, archt.

Pa., Easton — Lafayette College, Easton, Watson Hall of International Affairs Bldg., to Collins & Maxwell, Inc., 600 Bushkill Dr. Over **$300,000.** Bids 5/3. CD 4/29—ENR 5/6

COMMERCIAL BLDGS. (Contracts Awarded, Cont'd.)

Pa., Havertown — Frank Faccilo, Center Bldg., Lansdowne, residential development, Clifford Rd., separate contracts. **$250,000.**

Pa., Holmes—Roy V. Williams, Holmes, residential development, Armstrong Ave. and Lee Terrace, separate contracts. **$290,000.**

Pa., Phila.—Crescent Homes, Inc., 7975 Oxford Ave., residential development, Windish St., separate contracts. **$260,000.**

Pa., Pittsburgh—Tuberculosis League, 2851 Bedord Ave., 3 and 4 story, 40x140 ft., brick, steel nurses home, to Mellon Stuart Co., 210 E Parkway. Est. **$350,000.** CD 5/19—ENR 5/27.

Pa., Ridley Park — Herman Silver, 3335 Huntingdon St., Phila., residential development, Comerford Ave., separate contracts. **$48,000.**

Pa., Yardley—Charles E. Metz, Yardley, residential development, N. Main St. etc., separate contracts. **$250,000.**

R. I., Johnston—Mitola Bros., Georgian Ct., North Providence, 17 two story, bsmnt., 70 family unit, stucco, cinder block apartments. Owner builds. **$625,000.** Vincent DiMase, 201 Dean St., Providence, archt.

S. C., Columbia — St. Josephs Catholic Church, c/o contractor, church, to Southeastern Constr. Co., 218 W. 2 St., Charlotte, N. C. Est. **$270,000.**

Tex., Houston — Southwestern Properties, 2143 Westheimer St., 20 residences, to R. W. Peckham & Sons, 2143 Westheimer Rd. **$365,000.** CD 10/3/46—ENR 10/10/46.

•Tex., Houston — San Jacinto Lumber & Building Co., 6700 Lyons St., 170 dwellings in Denver Addn. Annex, own forces. **$1,100,000.** CD 9/9.

Va., Arlington — Garfield I. Kass, Kass Realty Co., 4461 Connecticut Ave. N.W., Wash., D. C., store, Wilson Blvd. and N. Garfield St., separate contracts. **$500,000.** James J. Hogan, c/o owner, archt. G. C. Murphy, McKeesport, Penna., lessee.

Va., Norfolk—The Bank of Virginia, c/o Baskervill & Son, archts., Central Natl. Bank Bldg., branch bank, to Doyle & Russell, Central Natl. Bank Bldg., Richmond. **$273,438.** Bids 6/2. CD 5/24—ENR 5/27.

•Va., Norfolk—Nicholas C. Wright, Oscar F. Smith, Arthur J. Winder, Ralph E. Bush, 412 Flatiron Bldg., 472 unit, frame, brick veneer garden type apartment development on Lafayette River, to Bush Constr. Co., 412 Flatiron Bldg. **$3,600,000.** A. Ray Pentecost, Jr., Colonial Ave. and 21 St., archt.

Va., Richmond — Grace Baptist Church, Blvd. and Grove Aves., church, Eton Pl. and Block 13, Windsor Farms, to Doyle & Russell, Central Natl. Bank Bldg. **$400,000.** CD 29—ENR 4/1/48.

B. C., Kelowna—Famous Players Canadian Corp., 736 Granville St., Vancouver, rein.-con. steel truss theatre and stores, to Smith Bros. & Wilson, Ltd., 2167 Richards St., Vancouver. **$250,000.** Awarded 6/12. Townley & Matheson, 1376 Hornby St., Vancouver, archt.

N. B., Fredericton—New Brunswick Power Comn., 55 Canterbury St., St. John, telephone office, to MacPherson & Myles Constr. Co., Ltd., Nashwaaksis. Approx. **$240,000.** Bids 2/23. CD 2/13—ENR 2/19.

INDUSTRIAL BUILDINGS

BIDS ASKED

Bids Asked About July 1

Fla., Tampa — SALES and SERVICE—Sharpe & Co., Tampa and Whiting Sts., auto sales and service bldg., Norman F. Six, Hillsboro Hotel Lobby, archt.

Bids Asked

•Colo., Denver — WAREHOUSE — Western Electric Co., 195 Broadway, New York, N. Y., 1 story, warehouse, E. 40 Ave. between Columbine and Clayton Sts. $2,000,000. Roberts & Schaefer, 307 N. Michigan Ave., Chicago, Ill., engrs. and archts.

O., Cleveland—FACTORY—Eaton Mfg. Co., E. 65 and Central Ave., 35,000 sq. ft. steel, brick factory addn. George S. Rider Co., Terminal Tower, engr.

Pa., Media—BAKERY—Cewiss Bakery, c/o Garner & Bauzenberger, archt., 10 S. 18 St., Phila., bakery and store. Over $68,000.

•Tex., Port Lavaca—PLANT—Aluminum Co. of America, Commerce Bldg., Houston, smelting or reduction plant with two pot lines, electric generating plant, carbon electrodes plant, docks, site development, etc. $50,000,000. Wyatt C. Hedrick, 5201 Fannin St., Houston, engr. and archt. Thomas D. Jolly, c/o owner, Gulf Bldg., Pittsburgh, Pa., ch. engr. CD 5/20—ENR 6/3.

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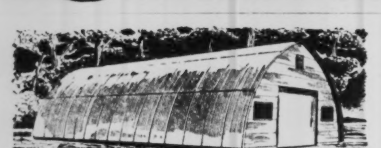

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INDUSTRIAL BUILDINGS (Cont'd)

SOON LETS CONTRACT

Ala., Birmingham—PLANT—Ten
Iron & Railroad Co., Brown-Marx
lets contract plant alterations
$176,000. Shaw & Renneker, 2021 6 A
archts. CD 7/1/46—ENR 7/25/46.

Conn., Stamford—PLANT—Plasti
Inc., 280 Fairfield Ave., soon lets
story, 100 x 132 ft., 2 story, 50 x 11
cinder block, steel factory. Fa
$125,000. Fletcher Thompson Inc
St., Bridgeport, archt. CD 9
9/6/45.

O., East Cleveland — GARAGE
Realty Co., 14481 Euclid Ave., soon
tract, L shaped, brick, rein.-con. ga
to Chevrolet Sales office. Christian
zenberg & Gaede, 1836 Euclid Ave.,
engrs.

Tex., Dallas — WAREHOUSE —
Philp, 1102 Pacific St., soon lets
2 story, bsmnt., 106x220 ft. warehouse
106x160 ft. factory, steel, masonry,
slab fdn. $175,000. De Witt &
2025 Cedar Springs St., archts.

Tex., Dallas—PLANT—Page Boy Mfg.
1505½ Elm St., soon lets contra
George L. Dahl, 1920½ Main St., archt.
6/8—ENR 6/17.

Wash., Spokane—GARAGE—Rie
Inc., 1 and Adams St., soon lets contra
story bsmnt., rein.-con. garage. $250
Whitehouse & Price, Hutton Bldg., archts

LOW BIDDERS

Ala., Gadsden—BOTTLING PLANT—Co
Cola Bottling Co., June 10, Gadsden bott
plant alterations, addns., from Day & Richa
son Co., 429 S. 24 St., Birmingham. $182,
CD 6/2—ENR 6/10.

Calif., San Francisco—WAREHOUSE—
kins Van & Storage Co., 13 and Missions
June 11, 3 story rein.-con. storage bldg., f
Cahill Bros., 206 Sansome St. **$279,793.**
6/2—ENR 6/10.

Calif., San Francisco — SHOWROO
OFFICE, SERVICE—J. W. Allen, c/o Elli
& King, engrs., 1045 Sansome St., June
1 story, bsmnt., concrete showroom, office
service bldg., from Monson Bros., 475 6
$221,989. CD 6/4—ENR 6/10.

Calif., San Jose — ABATTOIR — San J
Meat Co., c/o Myron C. Gould Assoc., eng
149 New Montgomery St., San Francisco, ab
toir alterations, addns., from Earl Heple,
Delmas Ave. **$221,000.** CD 6/1—ENR 6/3.

Fla., Miami — WAREHOUSE, etc. — Fr
ericks Market, c/o Edwin T. Reeder, arch
1777 Biscayne Blvd., warehouse and re
store, from J. Moretti, c/o archt. **$399,990.**
5/21—ENR 5/27.

Mo., Washington—SALES and SERVIC
M. & M. Motor Co., Washington, rejected b
June 1, 51x98 ft. concrete auto sales and se
ice bldg., 26 ft. high, incl. 21x50 ft. showro
CD 5/24—ENR 5/27.

Pa., Stowe—PLANT—Stanley G. Flagg
Co. Inc., Stowe, rejected bids May 25, pl
addns., alterations. Est. over $70,000.
5/20—ENR 5/27.

CONTRACTS AWARDED

Ala., Anniston—PIPE PLANT — Alaba
Pipe Co., c/o Strickland & Schroeder, eng
First National Bank Bldg., Birmingham,
mfg. plant addn., to Andrew, Dawson
Shenesey, Anniston. **Est. $250,000.**

Ark., Newport—FACTORY—Newport Indu
trial Development Assn., Newport, factory,
Joyce-Wooten Constr. Co., c/o F. L. Thom
son, archt., 104 W. Adams Ave., Kirkwo
Mo. **$126,737.** Bids 6/3. CD 5/19—ENR 5

Calif., Clearwater — FACTORY — Elect
Auto Lite Co., Toledo, O., 1 story, 85,
sq. ft. steel frame battery mfg. plant,
Al-Co Co., 5423 Flemish Village, Lane, L
Angeles. Bids 5/17, awarded **6/7.** F.
Ropp, 727 W. 7 St., engr.

Conn., Hartford—FUR PLANT—Freed's F
Shop, 99 Pratt St., 2 story, brick, steel, lim
stone fur plant, Allyn St., 2 stores on 1st flo
to Southern New England Constr. Co., In
242 Trumbull St. Est. **$130,000.** Ebbets, Fr
& Prentice, 862 Asylum Ave., archts.

Ga., Atlanta—WAREHOUSE—Mauck & Hi
c/o contractor, warehouse, to Herrman Cons
Co., 554 Luckie St. N.W. Est. **$75,000.**

Ga., Savannah—WAREHOUSE—Pittsbur
Plate Glass Co., c/o contractor, warehouse,
Olaf Otto, 412 E. Bay St., Savannah. Es
over **$68,000.** CD 5/14—ENR 5/20.

Ill., Chicago—PLANT—Eckhart Milling C
1300 Carroll St., plant addn. for wheat cleanin
masonry, to Bulley & Andrews, 2040 Harris
St.; plumbing, to Great Lakes Plumbing
Heating Co., 3229 Belmont St. Est. **$75,00**
MacDonald Eng. Co., 188 W. Randolph S
archt.

Ill., Chicago — PLANT — International Ha
vester Co., 180 N. Michigan St., interior pla
alterations, to R. H. Burkhardt, 180 N. Mich
gan St. Est. **$174,000.**

Ill., Skokie—FACTORY, etc.—Farley Mf
Co., 2650 Beldon St., Chicago, 1 story, 120x3
ft., brick, concrete factory and office, to B.
Regnell Co., 1005 Belmont Ave., Chicag
CD 2/11—ENR 3/4.

DUSTRIAL BLDGS. (Contracts Awarded, Cont'd.)

Ind., Indianapolis—WAREHOUSE—General otors Corp., United Motors Div., H. S. Sta-en. zone mgr., 730 E. Washington St., 2 ory, 86,000 sq. ft. brick, rein.-con. ware-use, to Berke Constr. Co., 1831 N. Grand Est. **$500,000.** Awarded 6/14.

Ind., Indianapolis—WAREHOUSE—Graybar ectric Co., 400 W. New York St., 1 story, ,000 sq. ft. brick, rein.-con., structural steel arehouse, W. 16 and Harding Sts., to Berke onstr. Co., 1831 N. Grand St. Est. **$100,000.** warded 6/14.

Ky., Russell—ROUNDHOUSE—Chesapeake & hio Ry. Co., L. T. Nuckols, ch. engr., 823 Main ., Richmond 10, Va., exten. roundhouse, in-alling 5 electric drop pit tables, etc., to ghes-Foulkrod Co., Schaffer Bldg., Phila., a. **$220,700.**

Md., Baltimore—WAREHOUSE, etc.—Wm. Wielands & Co., Richard Anderson, in harge, 3509 E. Eastern Ave., 1 story, 120 x 0 ft., brick, warehouse and office, to E. Eyring sons Co., 808 S. Conklin St. **$100,000.** Awarded 10. John F. Eyring, 810 S. Conklin St., archt.

Minn., Minneapolis — WAREHOUSE — Sun-ine Biscuits, Inc., 701 Washington Ave. N., eneral contract 1 story, 90x148 ft., warehouse ddn. to factory, to Swenson Constr. Co., 3305 errace St., Kansas City, 8, Mo. **$75,000.** M. aley, c/o owner, archt.

Mo., St. Louis—SALES and SERVICE, etc.—ilbert Buick, Inc., 5640 Gravois Ave., Zone 16, story. 120 x 143 ft., brick, steel, concrete auto ales, service and garage bldg., 3510 Gravois ve., to Russell Decker, 7313 Burwood Ave., one 15. John Grunik, 6635 Delmar Blvd., University City, Zone 5, archt.

Mo., St. Louis—WAREHOUSE—Charles Ta-olola, 4999 Fyler Ave., Zone 9, 1 story, 50 x 26 ft., brick warehouse addn., own forces.

Mo., St. Louis—SALES and SERVICE, etc.—sage Sales Co., 3905 S. Grand Blvd., 1 story, x 53 ft. incl. second floor 32 x 26 ft. living uarters, brick, steel auto sales, service and arage bldg., Grand Blvd. and Keokuk St., to The Gloster Co., 4607 Beck Ave., Zone 16. Otto chwalk, 5034 A Louisiana Ave., Zone 11, archt.

N. C., Forest City — PLANT — Laurel Hill orp., contractor, 150 x 300 ft. mfg. plant, to E. Carpenter, Shelby. Est. over **$100,000.**

N. C., High Point—STORAGE—High Point Hardware Co., c/o contractor, storage and tore facilities, to R. K. Stewart & Sons, High Point. Est. **$100,000.**

N. D., Bismarck—WAREHOUSE, etc.—Da-ato Tractor & Equipment Co., Fargo, 102 x 38 ft., concrete warehouse and sales bldg., with 40 x 60 ft. adjoining bldg., to John Larson, 00½ 3 St. Approx. **$75,000.**

O., Cleveland Heights—GARAGE—Barbor Motors, Inc., 2900 Mayfield Rd., design and onstruction 1 story, 70x110 ft., brick, block ervice garage addn., 2910 Mayfield Rd., to Austin Co., 16112 Euclid Ave., Cleveland. **$75,000.**

Pa., Aspinwall—GARAGE—Jack Keefe, 313 Freeport Ave., 1 story, 50 x 130 ft., brick, arage, to Crump, Inc., 4031 Bigelow Blvd., Pittsburgh. Est. **$90,000.**

Pa., Mt. Lebanon Twp. — GARAGE — Fieldbrook Motors, Inc., 439 Washington Rd., Pittsburgh, Zone 15, 1 story, 75 x 200 ft. brick arage, Washington Rd., to P. S. Edwards, R.D. 1, Library. Est. **$80,000.**

Pa., Myerstown — WAREHOUSE — Publix Shirt Corp., Myerstown, 3 story, 63x65 ft., brick, steel warehouse, to Sharp Constr. Co., 10 N. 5 St., Reading. **$70,000.** Monroe S. Haak, 724 S. Railroad St., archt.

Pa., Phila.—PLANT—Keystone Cleaners & Dyers, 2107 Hunting Park Ave., 1 story, 54x99 ft., brick cleaning plant to Sidney Elkman, Middle City Bldg. **$70,000.**

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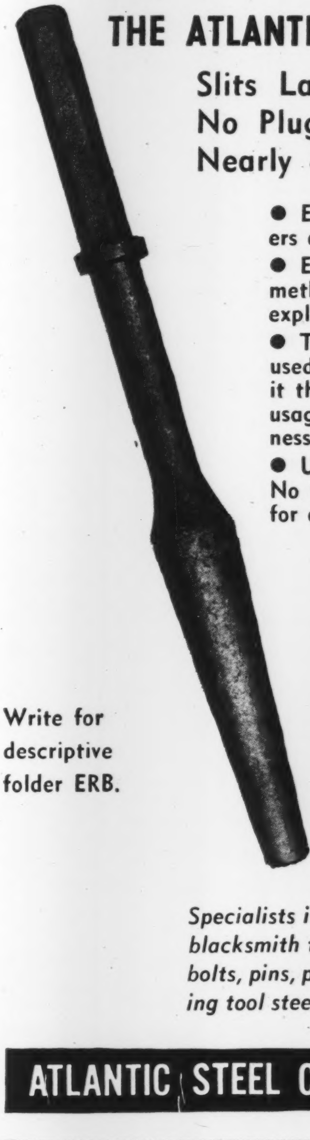

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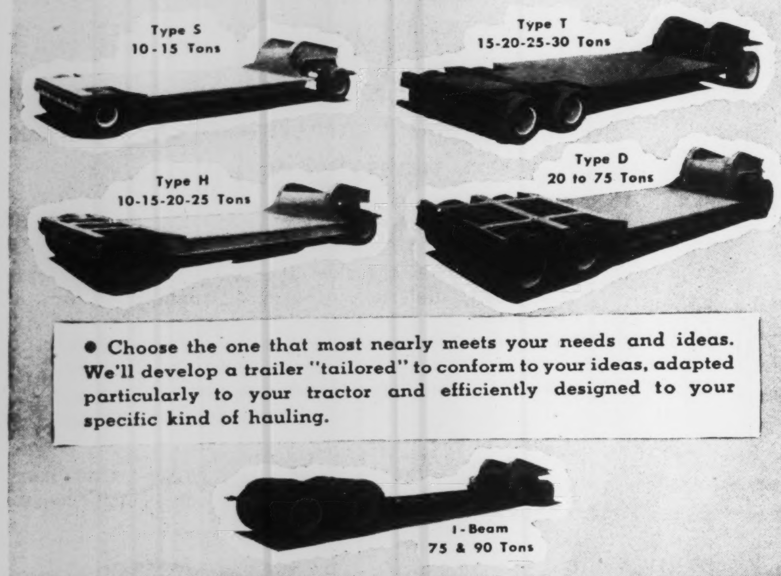

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INDUSTRIAL BLDGS. (Contracts A Cont'd.)

Pa., Phila. — MACHINE SHOP — Waring Co., 102 E. Mermaid Lane, 29x53 ft. and 56x64 ft., concrete bl chine shop addn., to Joseph R. Far 4422 Market St. **$80,000.** Heacock 152 N. 15 St., archts.

Alabama—RURAL DISTRIBUTION —Coving Electric Co-operative Inc lusia, 262.2 mi. rural distr. lines, Covington Co., to G. T. Key Co., 1212 St., Montgomery, labor **$82,665,** **$262,000,** total $344,665. Lanier En 102½ Elm St., Troy, engr.

●S. C., Columbia — WAREHOUSE — Stores, c/o Robert & Co., archts., Bos Bldg., Atlanta, Ga., food storage war to Virginia Eng. Co., Newport News **$1,000,000.** Bids 6/8. CD 6/4—ENR 6/1

Tenn., Nashville—WAREHOUSE—C. B. Rag land Co., 300 2 Ave. S., grocery wareho W. F. Holt & Sons, Hillsboro Dr. Est **$100,000.**

Tex., Dallas—TOWER—Dallas Pow Light Co., 1506 Commerce St., concrete tow for cooling power generator. Owner **$160,000.**

Tex., Grand Prairie — PLANT — Chan Vought Aircraft Corp., 550 Main St., Stra ford, Conn., remodeling, altering, aircraft mf plant, own forces. **$500,000.** CD 4/1—EN 4/15.

Tex., Houston—PLANT—Reed Roller Bit Co 5125 Clinton Dr., ren.-con. fdns. for plant add and permanent type paving and co driveways, to Schneider Constr. Co., 3004 W Dallas St. **$232,000.** Lockwood & Andrew Union Natl. Bank Bldg., engrs. CD 6/9—EN 6/17.

Tex., Quitman — WAREHOUSE, etc. — Fra Drilling Co., c/o B. Manziel, Quitman, ware house and yard storage. Purchase and Hir **$70,000.**

Tex., Realitos — PLANT — B. C. Graham Cam Corp., San Diego, pressure maintenanc plant, own forces. **$110,000.** CD 6/4—ENR 6/1

Wis., Dresser — PLANT — Rock Ridge Dai Co-operative Assn., Dresser, general contra 1 story, 113 x 180 ft., brick, tile milk plant, J. Fossom, Frederick. Est. about **$150,000.** C 3/31—ENR 4/8.

Wis., Mellen—GARAGE—Minton Motor Co Mellen, 1 and 2 story, 66 x 140 ft., steel, brick concrete block garage, day labor. G. A. Krasin Marshfield, archt.

Wis., New Richmond—GARAGE—Cox Moto Sales, Inc., New Richmond, 1 story, 80 x 114 ft. concrete block, concrete columns, garage, con crete fdn., to E. F. Steneman, Roberts. H. B Crommett, 2370 Buford Ave., St. Paul, Minn. archt.

B. C., Vancouver—BREWERY—Vancouve Breweries, Ltd., 2700 Vine St., 32x94 ft. stee malt storage bldg., 48 ft. high, to Smith Bros & Wilson, Ltd., 1267 Richards St. **$175,000** Mercer & Mercer, 615 W. Hastings Sts., archts CD 4/1—ENR 4/15.

UNCLASSIFIED

BIDS ASKED

Bids Asked June 28

N. Y., Middletown—SWIMMING POOL, etc. —Dpt. P. Wks., City Hall, swimming pool, appurtenances at Francher-Davidge Park.

Bids Asked June 29

Illinois—RURAL DISTRIBUTION LINES—Clay Electric Co-operative, Inc., William Stanford, pres., Flora, labor only, 123 mi. rural distr. lines, 32 extens. alternate bid covering setting of poles, etc. in Wayne, Clay, Richland and Marion Counties. Plans deposit $25. Rural Line Engineers, 2 S. Central Ave., Clayton, St. Louis, 5, Mo., engrs. CD 6/8—ENR 6/17.

N. Y., Springfield—PLAYGROUND—Comr. Parks, Dpt. Parks, Arsenal Bldg., Central Park, 64 St. and 5 Ave., New York, Zone 21, playground adjacent to P.S. 176 between 235 and 237 Sts, north of 121 Ave., Queens Boro. Contr. No. OG-15300-148. Plans deposit $20.

Bids Asked June 30

La., New Orleans—WHARF—Port of New Orleans, No. 2 Canal St., concrete fdns. on timber piling and concrete rear roadway for Esplanade Ave. Wharf. Plans deposit $25. CD 10/1/45—ENR 10/18/45.

Bids Asked July 7

N. S., Ingonish Ferry—WHARF—J. S. Somerville, secy. Dpt. P. Wks., Ottawa, Ont., repairing wharf, and harbor imprvs. About $35,000. Plans deposit $20. Extended date. R. Blais, c/o owner, engr. CD 4/13—ENR 4/15.

CLASSIFIED (Bids Asked, Cont'd.)

Bids Asked July 8

†Alabama—TURFING—U. S. Eng., P. O. ox 1169, Zone 7, Mobile, turfing graded areas Reserve Fleet Storage on Tensas River near urrican, at Sizemore Landing and Lower ll Landing, Inv. Eng.-01-076-48-251.

Bids Asked July 9

Fla., Daytona Beach—PIERS—City, mayor's ce, approx. 2,500 lin. ft. piers, 8 ft. wide, pprox. 1,420 lin. ft. finger piers attached ereto, etc. Plans deposit $20. C. H. Moneyenny 312 Hillside Ave., consult. eng.

Bids Asked July 13

New York — TUNNEL PLAZA — Triborough ridge and Tunnel Auth., 10 State St., New ork, Zone 4, Manhattan Plaza of the Brookn-Battery Tunnel. Plans deposit $25. CD 18—ENR 2/26, under LB.

Bids Asked July 15

California—TRAFFIC SIGNAL SYSTEM, c.—State Div. Hys., State Bldg., Los ngeles, furnishing, installing, full traffic tuated signal systems and highway lighting 2 intersections and semi-traffic actuated gnal systems and highway lighting, 7 interctions on Foothill Blvd. from Central to omonwealth Aves., Los Angeles Co. G. T. cCoy, Sacramento, hy. engr.

Bids Asked July 22

†Montana—RADIO TELEPHONE TRANSITTERS, etc.—Bureau Reclamation, Dpt. Inrior, Bldg. 1-A, Denver Federal Center, Denr, Colo., 7 radio telephone transmitters, 7 equency-modulation receivers, 2 remote conol units, maintenance equip. for transmission ne patrol, Spec. 2280.

Bids Asked

R. I., Providence—ATHLETIC FIELD—City, J. Roberts, mayor, City Hall, rein.-con. adium, athletic field, drainage, flood lighting ld house, playing field, Mt. Pleasant High chool. $425,000. Charles A. Maguire & Asc., 1015 Turks Head Bldg., engrs. CD 9/24 —ENR 10/16.

†Texas—GAS MAIN—Lone Star Gas Co., 1915 ood St., Dallas, 135 mi. 12-to 16-in. natural as main between vicinity Hamilton to Kerrlle. $2,300,000; expan. gas system, Kerrville, 5,000. CD 5/17—ENR 5/27.

Tex., Gladewater — STADIUM — Gladewater ub. Schools, Gladewater, stadium imprvs., exans. $50,000. W. L. Kelly, 521 Glover Crim ldg., Longview, engr.

OON LETS CONTRACT

La., Chalmette—WHARF IMPRVS.—Meran Sugar Refinery, 120 Wall St., New York, Y., soon lets contract superstructure on harf and approaches at Chalmette Refinery. D 11/15/46—ENR 11/28/46.

LOW BIDDERS

California — GAS PIPELINE — Southern alif. Gas Co., 810 S. Flower St., Los Angeles, une 7, 30 in. welded steel gas line, etc. iviera to Pasadena, from Alex Robertson o., 811 Paramount Blvd., Clearwater. Approx. **500,000.** CD 4/13—ENR 4/29.

La., Baton Rouge—TRAFFIC CONTROL YSTEM—City, June 9, traffic control sys. for owntown business dist., Proposal B, elecrical installation, from Electric Shop, Inc., 29 Main St. **$63,948.** CD 5/14—ENR 5/20.

†N. Y., St. George—TERMINAL—Comr. Marine & Aviation, Pier A, North River, foot of Battery Pl., New York, Zone 6, terminal bldgs. with demolition and fdn. for Sect. 2, reconstruction terminal and approaches at St. eorge Ferry Terminal, Contr. 2594 from James J. Waters Corp., 415 Lexington Ave., New York, Zone 17. **$6,174,973.** CD 6/3—ENR 6/10.

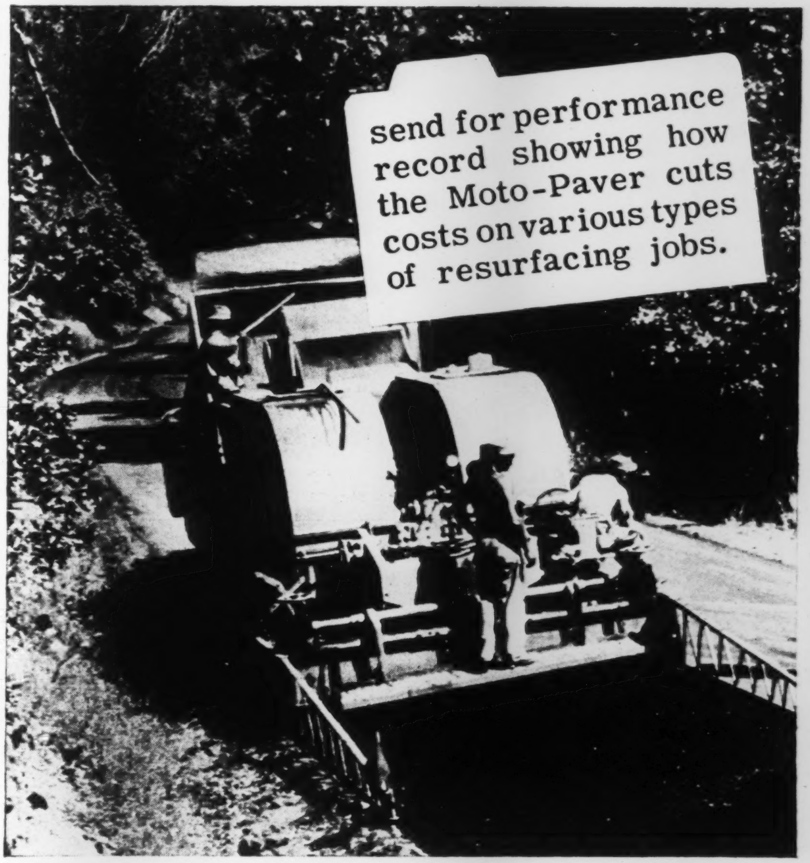
†Oregon — TRANSMISSION LINE — Bonneville Power Admin., 1300 N.E. Union St., Portland, 38.7 mi. 115 kv. transmission line, 100 ft. right-of-way, woodpole, H-frame Eugene to Mapleton, Lane Co., Inv. 4246, from Smith Bros., Inc., 29 Algona Dr., Vancouver, Wash. **$189,550.** CD 6/1—ENR 6/3.

Oregon — FISH REARING PONDS — State Game Comn., 1634 S.W. Alder St., Portland, fish rearing ponds at Roaring River Hatchery, from Ken. Ward Constr. Co., 5120 S.E. Milwaukee St., Portland. **$71,100.**

Oregon — TRANSMISSION LINE — Pacific Power & Light Co.; Public Service Bldg., Portland, 41.8 mi. power transmission line between Maupin and Madras, from McPhail Eng. Co., 2904 Alaska St., Tacoma, Wash. **$188,700.** CD 11/18/47—ENR 12/11/47.

Tennessee—RURAL DISTRIBUTION LINES —Middle Tennessee Electric Membership Cooperative, Murfreesboro, June 10, 107.4 mi. rural distr. lines, Rutherford Co., etc., from Whalley Constr. Co., c/o Wm. M. Wilson, engr., Shelbyville. **$134,215.** CD 5/24—ENR 5/27.

Tex., McAllen — STADIUM — McAllen Independent School Dist., McAllen, stadium, from Cours & Lairrabee, P. O. Box 1673, McAllen. **$87,565.** CD 2/17, under LB.



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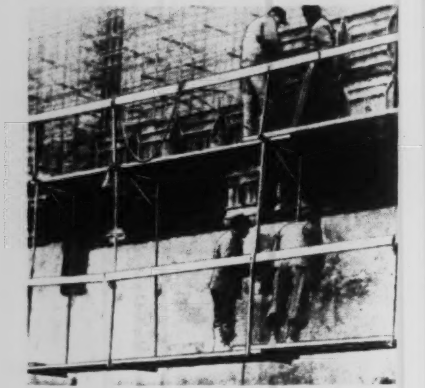

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UNCLASSIFIED (Continued.)

CONTRACTS AWARDED

Alabama—RURAL DISTRIBUTION LINES—Joe Wheeler Electric Membership Co-operative, Hartselle, 100 mi. rehabilitation, 250 mi. new rural distr. lines, Morgan Co., to W. L. Coston & Sons, 1 Natl. Bank Bldg., Birmingham. **$266,862.** Bids 5/4. CD 5/28—ENR 6/3.

Alabama—RURAL DISTRIBUTION LINES—Clarke-Washington Electric Membership Corp., Jackson, 168 mi. rural distr. lines, Clarke and Washington Counties, to Irby Constr. Co., 817 S. State St., Jackson, Miss., labor **$48,633,** materials **$168,000,** total $216,633. Godat & Heft, Terminal Station Bldg., New Orleans, La., engrs.

Alabama—RURAL DISTRIBUTION LINES—Coving Electric Co-operative, Inc., Andalusia, 265.8 mi. rural distr. lines, Sect. 2, Covington Co., to G. T. Key Co., 1212 S. Hull St., Montgomery, labor **$86,354,** materials **$265,000,** total $351,354. Lanier Eng. Co., 102½ Elm St., Troy, engrs.

Ala., Boaz—RURAL DISTRIBUTION LINES—Dekalb Electric Co-operative Corp., Boaz, 62.84 mi. rural distr. lines, Marshall Co., to Line Constr. Co., Clarksdale, Miss. **$78,824.** Bids 6/8. CD 5/28.

✝Arizona-Nevada — TRASHRACKS — Bureau Reclamation, Dpt. Interior, Bldg. 1A, Denver Federal Center, Denver, Colo., June 8, furnishing, del. f.o.b. cars Oakland, Calif., 300 trashracks for intake structure at Davis Powerplant, Davis Dam Project, Spec. 2235, from Independent Iron Wks., Inc., 821 Pine St., Oakland, Calif. **$103,885.** CD 5/11—ENR 5/13.

Fla., Miami Beach—SWIMMING POOL—Shoreham-Norman Hotels, 525 Ocean Dr., swimming pool, to S. C. Davis Constr. Co., 1815 Purdy Ave. Over **$50,000.**

Georgia—RURAL DISTRIBUTION LINES—Hart Co. Electric Membership Co-operative Corp., Hartwell, 158 mi. rural distr. lines, Hart Co., to Alrich Electric Constr. Co., 507 Broad St., Augusta, labor **$56,829,** materials **$158,000,** total $214,829. Marcus C. Long, Alma, engr. CD 3/3—ENR 3/8.

Georgia—RURAL DISTRIBUTION LINES—Satilla Rural Electric Membership Co-operative Corp., Alma, 310 mi. electric distr. lines, Bacon Co., to Bentley Electric Constr. Co., Quincy, Fla., labor **$74,653,** materials **$310,000,** total $384,653. Marcus C. Long, Alma, engr.

Georgia—RURAL DISTRIBUTION LINES—Sumter Electric Membership Co-operative, Americus, 147.62 mi. rural distr. lines, Sumter, Lee, and Webster Counties, to Chamblees & White, Alamo. **$53,518.** Bids 6/10—CD 5/24—ENR 5/27.

Illinois—RURAL DISTRIBUTION LINES—Monroe County Electric Co-operative, Inc., C. M. Douglas, mgr., Waterloo, Ia., reshaping rural distr. lines, Monroe and St. Clair Counties and vicinity, force account. **$170,000.** CD 3/27—ENR 4/17.

Iowa — RURAL DISTRIBUTION LINES—Pocahontas County Rural Electric Co-operative, George M. Stockdale, mgr., Pocahontas, 55 mi. rural distr. lines, line changes, etc. Pocahontas Co., force account. **$145,000.** CD 6/10—ENR 6/17.

Kansas—RURAL DISTRIBUTION LINES—Leavenworth Jefferson Electric Co-operative Co., Inc., McLouth, 101 mi. rural distr. lines, Leavenworth Co., to Arthur Tucker Constr. Co., 619 Jackson St., Topeka, labor **$29,842,** materials **$101,000,** total $130,842.

Kansas—RURAL DISTRIBUTION LINES—P. R. and W. Electric Co-operative, Inc., Wamego, 157.55 mi. rural distr. lines, Pottawatomie Co., to Walco Eng. & Constr. Co., 2408 E. 54 Pl., Tulsa 4, Okla., labor **$52,874,** materials **$157,000,** total $209,874. Bids 3/9. CD 3/3.

Kansas—RURAL DISTRIBUTION LINES—Western Co-operative Electric Assoc., Wakeeney, 160 mi. rural distr. lines, Trego Co., to Thompson, Haight & Keister, 2006 N. Portland Ave., Oklahoma City, Okla., labor **$47,426,** materials **$160,000,** total $207,426. Bids 4/9. CD 4/7—ENR 4/15.

Kentucky—TRACKS—Chesapeake & Ohio Ry. Co., L. T. Nuchols, ch. engr., 823 Main St., Richmond 10, Va., passing tracks at Pauley to Winston Ford, Prestonburg. **$121,300.**

Kentucky—TRACKS—Louisville & R.R. Co., C. H. Blackman, ch. eng Broadway, Louisville, Zone 1, mi Horse Creek Branch, Cumberland D Gail Coal Mines, own forces. **$57,800**

Minnesota—RURAL DISTRIBUTIO —Wild Rice Electric Co-operat Mahnomen, 247 mi. rural distr. lines Co., to Swift Electric Co., Wheat **$73,355** materials **$247,000,** total $32 J. Hastad, Halstad, engr.

Mississippi—RURAL DISTRIBUTIO —Central Electric Power Assoc., 115 mi. rural distr. lines, Leake Co Electric Constr. Co., 815 S. State S son, labor **$34,255,** materials **$115,000** $149,255. Bids 4/20. CD 5/13.

Mississippi—RURAL DISTRIBUTION —Four County Electric Assoc., Colum mi. rural distr. lines, Oktibbeha Co., liam H. Alsup & Assoc., Inc., 414 Madden Bldg., Jackson, labor **$64,115,** terials **$176,000,** total $240,115. Allen shall, 65 McCall Pl., Memphis, Tenn CD 10/31/45—ENR 12/13/45.

Miss., Jackson—STADIUM—Hinds Co son, Part 2, Veterans War Memorial Sta to McNeese Constr. Co., Commerce Titl Memphis, Tenn. **$162,147.** Bids 6/8, —ENR 6/3.

Missouri — RURAL DISTRIBUTION —Sac-Osage Electric Co-operative, In Dorado Springs, 197.88 mi. rural dist Cedar Co., to B. B. Winsett & Co., P.O. 4137, Memphis 1, Tenn., labor **$85,936,** terials **$198,000,** total $283,936. CD 12 —ENR 1/9.

Mont., Thompsons Falls—LINE CHAN etc.—Northern Pacific Ry. Co., B. Blum, engr., 176 E. 5 St., St. Paul 1, Minn., gradi line change near here, to J. A. Terteling Sons, Inc., 4011 Fairview Ave., B **$50,000.**

N. D., Ryder—RAILWAY GRADING, Northern Pacific Ry. Co., B. Blum, ch. en 176 E. 5 St., St. Paul 1, Minn., grading change to Haagenson & Tranby, McInto Minn. **$94,000.**

N. Y., New York—PARK—Comr. Parks office Dpt. Parks, Arsenal Bldg., Central Pa 64 St. and 5 Ave., Zone 21, park between U versity and Merrian Aves. at W. 169 Bronx Boro, Contr. No. XG-7600-148, Brookfield Constr. Co., 521 Fifth Ave., York, Zone 17. **$175,800.** Bids 6/2. CD 5 —ENR 5/27.

R. I., Providence—RADIO STATION—Cher & Webb, 275 Westminster St., 1 story, 110x1 ft., rein.-con. studio and station addn., We Exchange St., to E. Turgeon Constr. Co. Inc., 614 Turks Head Bldg. Est. **$100,000.** CD 9/8/44—ENR 9/21/44.

Tex., Fort Worth — RADIO-TELEVISIO STATION—Fort Worth Star Telegram, c/o A. T. Carter, 400 W. 7 St., 2 story, 98x158 ft., brick, tile, concrete, steel Radio-Televisio Station 2, on 4000 Normandy Dr., to Thoma S. Byrne, Inc., Fort Worth Natl. Bank Bldg. **$70,000.** Joseph R. Pilich, Commercial Standard Bldg., archt.

Tex., Fort Worth—STADIUM—Texas Christian University, Dr. C. M. Sadler, pres., rein.-con. stadium addn. to Thomas S. Byrne, Inc., Fort Worth Natl Bank Bldg. **$70,000.** Wyatt C. Hedrick, 1005 1st. Natl. Bank Bldg., archt.

●Texas, Oklahoma and Kansas—PIPELINE—Michigan-Wisconsin Pine Line Co. (United Light & Railway Co. and American Light & Traction Co., Phila., Pa. parent owners), 13 Grand Ave., Kansas City, Mo., Sect. 1, 22 mi. 24 in. welded joint natural gas main from Hansford and going northerly to near Wichita, Kan., to J. R. Horrigan Constr. Co., Commerce Bldg., Houston. Approx. **$12,600,000.** CD 3/7/45—ENR 3/15/45.

West Virginia—RAILWAY—Chesapeake & Ohio Ry. Co., L. T. Nuchols, ch. engr., 823 Main St., Richmond 10, Va., grading and track work to coal mine at Argoone, to Forbes Constr. Co., Huntington, and Wm. A. Smith Constr. Co., Chambers Bldg., Kansas City, Kan. **$408,320.**

CONSTRUCTION REPORTS

Bids—Contracts—Third Section

WATER SUPPLY

BIDS ASKED

Bids Asked June 30

La., New Orleans—New Orleans Sewer & Water Bd., 526 Carondelet St., watermain and sewer projs., Contrs. 183-S and Contr. 281-W. Plans deposit $2 each.

Wis., Ashwaubenon — Fox River Heights Sanitary Dist., deep well, furnish water distr. materials; install water distr. sys.; elevated storage tank. Foth & Porath, Inc., 409 E. Walnut St., Green Bay, engr.

Bids Asked July 12

Ore., Ashland—City, City Hall, 6 m.g.d. water treatment plant, 2 m.g. reservoir, two 500,000 gal. reservoirs. Plans deposit $20. Received no bids June 14. Harvey & Watkins, Goldy Bldg., Medford, engrs. CD 6/2.

LOW BIDDERS

●**Fla., Miami**—City, May 20, furnishing 13 mi. water piping, from Price Bros., 1932 E. Monument Ave., Dayton, O. **$1,252,055.** CD 4/16—ENR 4/22.

Ore., Sutherlin—City, City Hall, received no bids June 15, water treatment plant. Will readvertise. CD 6/4.

Pa., Northampton — Northampton Boro Municpal Auth., June 10, Contr. 1, water filtration and softening plant, from A. N. Newton Bugbee Co., 502 Walnut St., Catasauqua. **$319,032.** Albright & Friel, Inc., 1528 Walnut St., Phila., engr.

●†**Virgin Islands**—Rufe B. Newman, Jr. Deputy Comr., for Construction, Bureau Community Facilities, Pub. Bldgs. Admin., Federal Works Bldg., Wash., D. C., June 15, water supply facilities at Charlotte Amalie, St. Thomas and at Christiansted and Frederiksted, St. Croix, from H. I. Hettinger & Co., San Juan, Puerto Rico. **$1,107,255.** CD 5/17—ENR 5/20.

CONTRACTS AWARDED

N. C., Pittsboro—Town, water facilities, Sect. 1, dam, pumping station and force main, to Sanford Constr. Co., Sanford, **$28,200;** Sect. 2, water purification plant, to C. W. Gallant, 206 Latta Arcade, Charlotte, **$49,168.** CD 6/4—ENR 6/10.

Pa., Northampton — Northampton Boro Municipal Auth., watermains, to Buck & Donohue, 790 Broad St., Newark, N. J. **$65,000.** Bids 5/18—CD 5/10—ENR 5/13.

Pa., Northampton — Northampton Boro Municipal Auth., Contr. 2, water filtration and softening plant, to Robert Filter Mfg. Co., 6 St. and Columbia Ave., Darby. **$158,200.** Albright & Friel, Inc., 1528 Walnut St., Phila., engr. Bids 6/10.

SEWERS, WASTE DISPOSAL

BIDS ASKED

Bids Asked July 1

Ill., Chicago—Sanitary Dist., 910 S. Michigan St., sewage screens and auxiliary equip. at Calumet Sewage Treatment Works Exten., West Side Sewage Treatment Works and North Side Sewage Treatment Works, Contr. 47-47- (GEN-M) Stickney and Skokie; repairing pumps, blowers, steam turbines and steam reducers at Southwest Sewage Treatment Works, Contr. 48-20 (SW-M) Stickney. CD 6/15—EN 6/17, under LB.

Bids Asked July 12

Mo., Webster Groves (St. Louis 19, P.O.)—City, City Hall, 4 E. Lockwood Ave., 10,600 lin. ft. 21- to 66-in. rein.-con. sewer line, etc. Sects. A to F inclusive of Storm Sewers. Russell & Axon, 408 Olive St., St. Louis, Zone 2, engrs. CD 11/11/46—ENR 11/14/46.

Bids Asked July 13

Wis., Fond du Lac—City, G, pumping equip., H, vacuum filters; I, sewage meters; J, sludge dryer; K, incinerator; L, general construction sewage treatment plant. Plans deposit $10 G to K inclusive, plans deposit $25, for L. J. Donohue Eng. Co., 608 N. 8 St., Sheboygan, engr. CD 4/4/45—ENR 4/19/45.

Bids Asked About July 26

N. Y., New York Mills—Village, 800 ft. 54 in. storm water sewer, 3 concrete structures, B. C. Cookinam, 1305 Elm St., Utica, engr.

Bids Asked About October 1

●**Ill., East St. Louis**—East Side Levee & Sanitary Dist., Dan Foley, pres., 628 A Missouri Ave., 12½x12½ ft. box-Type trunk sewer, combined sanitary and storm water sewer, Illinois Ave., 16 to 20 Sts. and 20 St. to Ohio Ave., and Ohio Ave. to 29 St. $1,250,000. S. H. Kernan, c/o owner, ch. engr. Horner & Shifrin, Shell Bldg., 1221 Locust St., Zone 3, St. Louis 3, Mo., consult. engrs. CD 1/31/46—ENR 2/21/46.

LOW BIDDERS

Mass., Lexington—Town, Town Office, rejected bids June 1, sewers, Sect. B. L.B. **$153,055.** CD 6/9—ENR 6/17, under LB.

Tex., Houston—City, M. H. Westerman, secy., storm sewer unit to drain University of Houston campus, from Thomas Bate & Sons, 1107 Girard St. **$790,285.** CD 9/18/47—ENR 10/2/47.

Tex., San Antonio—City, June 17, sanitary sewers, various streets from V. L. Potter, 625 W. Summit St. **$51,271.** CD 8/7—ENR 9/21.

CONTRACTS AWARDED

Calif., San Anselmo—Marin Co. Sanitary Dist. 1, 11 Library Pl., sewage disposal works, sewage pump. plant, to Stolte, Inc., 8451 San Leandro St., Oakland, **$331,570;** sewage force main, pump. plant, effluent line, to R. J. Brant, 118 New Montgomery St., San Francisco, **$68,205.** CD 6/9—ENR 6/17, under LB.

BRIDGES

BIDS ASKED

Bids Asked June 30

Maine—State Hy. Dpt., Augusta, rein.-con., structural steel bridge, approaches over Englishman River, Rogue Bluffs, rein.-con. Driska Bridge and approaches over Chandler River, Jonesboro, both Washington Co.; Blodgett Bridge, approaches over Temple Stream, Temple, Franklin Co. Plans deposit $15 each.

Bids Asked July 15

†**Mississippi**—U. S. Eng., P. O. Box 60, Vicksburg, culverts, for Greenwood Protection Levee, Serial No. Eng.-22-052-48-484.

LOW BIDDERS

Florida—State Hy. Dpt., Tallahassee, June 17, widening concrete bridge across Pellicer Creek at St. John's-Flagler Co. line and widening 5 concrete bridges in St. John's Co., Jobs Nos., 7301-103, 7802-105 and 7801-107, St. John's and Flagler Counties from Hubbard Constr. Co., Orlando, **$67,747*****reconstructing bascule pier and fender at Hobe Sound Bridge, Rd. No. A1A., Job No 8903-903, Martin Co., from Cleary Bros. Constr. Co., West Palm Beach, **$90,056*****concrete, steel overhead structure, 8 in. rolled bank surface treatment approaches, etc. 0.756 mi. State Roads Nos. 33 and 559, Jobs Nos., 1607-301, and 1616-301, at the S. A. L. R.R. crossing in Polk City, Polk Co., from Ryan Constr. Co., 2406 Horatio Ave., Tampa, **$154,191***** 1,216 ft. concrete, steel bridge, over Yellow River, State Rd. 2, Federal Aid Secondary Proj. S-213 (1), Job No. 5710-201, Okalossa Co., from Coggin & Deermont, Chipley, **$239,023** ***approaches to Bayou Chico Bridge, cement concrete paving, etc., 0.395 mi. Rd. 292, Escambia Co., from Noonan Constr. Co., Pensacola, **$93,748.** CD 6/1—ENR 6/3.

N. Y., Albany—City, May 4, reconstructing Northern Blvd. Viaduct, from Cooley Contg. Co. 446 Second St. **$107,870.**

STREETS AND ROADS

BIDS ASKED

Bids Asked June 29

Massachusetts — Commonwealth of Mass., Boston, imprv. Howland Ave., Chap. 90, Adams; Grattan St., Chicopee; Suffield St., Agawam. Plans deposit $5 each.

Bids Asked June 30

Maine—State Hy. Dpt., Augusta, bituminous gravel road 2.3 mi. F.A. Proj. S-58 (2), Unity and Troy, bituminous macadam paving 4.5 mi. F.A.P. 298 (9), Bridgewater, Blaine and Mars Hill. Plans deposit $1 each.

Mass., Newton — City, City Hall, reconstructing concrete hy. Adams St. from Washington to Watertown Sts. Plans deposit $10.

Bids Asked July 2

Vermont—State Hy. Dpt., Montpelier, 0.17 mi. double tack coat refined tar with necessary grading and rein.-con slab, FAP S 161 (2), Lemington. Plans deposit $3.

Bids Asked July 6

Massachusetts — Commonwealh of Mass., Dpt. P. Wks., Boston, reconstructing state hy., F.A. Proj. S-49 (1), Chicopee. Plans deposit $10. Bids 5/11 rejected. L.B. **$159,222,** CD 5/14—ENR 5/20, under LB; constructing state hy., F.A.G.S. Proj. 15 (1), Montague. Plans deposit $10.

Bids Asked July 21

Louisiana—State Hy. Dpt., Baton Rouge, grading, draining bituminous aggregate paving 3.868 mi. Ringgold-Sibley Hy., State Route 90, S.P. 27-03-12, F.A.S. Proj. S.-178 (1), Webster Parish. Plans deposit $9.50, with cross sect. $23.

SOON LETS CONTRACT

Ia., Mount Pleasant—W. A. Sheaffer Pen Co., W. F. Heisin, vice pres., Fort Madison, soon lets contract 15,000 sq. yd. rein.-con. paving Sheaffer Sub-division, incl. 5,800 ft. concrete walks, etc. Robinson & Parnham, 6015 Grand Ave., Des Moines, engrs.

LOW BIDDERS

Massachusetts — Commonwealth of Mass., Boston, June 15, imprv. hy., Cambridge-Somerville, Middlesex Co., from John McCourt Co., 25 Huntington Ave., Boston, **$69,112.** est. $79,197; state hy. Medford and Somerville, Middlesex Co., from National Contractors Co., Inc., Somerville, **$56,314.** est. $55,055. CD 6/3—ENR 6/10.

Maryland—State Roads Comn., Baltimore, June 15, imprv. 1.371 mi. and grade separation at Hollins Ferry Rd., Baltimore Co., from Bero Eng. & Constr. Co., McKinley Bldg., Buffalo, N. Y. **$941,951. CD 6/9.**

●**Florida**—State Hy. Dpt., Tallahassee, June 17, imprv. approx. 2.302 mi. Rd. 436, Orange Co., 1.562 mi. Rd. 448, Orange Co., 6.898 mi. Rd. 426, Seminole Co., from Langston Constr. Co., Orlando, **$66,895*****2.76 mi. Rd. 99, Escambia Co., from Ray Constr. Co., Mobile Highway, Pensacola, **$86,417*****approx. 4.716 mi. Rd. 44, Sumter Co., from Marion Constr. Co., Ocala, **$144,171*****3.037 mi. Rd. 600, Hillsborough Co., from Brinson Constr. Co., 1 National Bank Bldg., Tampa, and Cone Bros. Constr. Co., Caesar Ave. and Cumberland St., Tampa, **$1,325,759*****2.465 mi. State Rds. 20 and 25, Alachua Co., from Marion Constr. Co., Ocala, **$174,109.** CD 6/1—ENR 6/3.

Mass., Newton—City, City Hall, June 16, resurfacing Beacon St., from National Contractors Co., Inc., Somerville. **$50,600.** CD 6/9.

New Jersey — State Hy. Dpt., Trenton, June 17, imprv. 0.4 mi. Mercer Co., from Geo. M. Brester & Son, 275 W. Fort Lee Rd., Bogota, **$633,469;** 0.4 mi., Union Co., from C. H. Winans Co., 125 Broad St., Elizabeth. **$157,625.** CD 6/1.

S. C., Charleston—City, J. C. Thomas, purchasing agt., June 15, street imprvs., from Wm. F. Bowe & Co., Augusta, Ga. **$598,150.** CD 8/11/44—ENR 9/7/44.

Tex., Austin — University of Texas, Bd. Regents, Austin, June 11, street imprvs. and asphalt paving, from Collins Constr. Co., 1701 W. 5 St. **$108,500.** Julian Montgomery, 602 West Ave., engr.

Tex., Houston — City, M. H. Westerman, secy., June 16, asphalt paving Main St. from Eagle to Ewing St., from Brown & Root, Inc., P.O. Box 3. **$244,638.** CD 11/22/44—ENR 12/14/44.

Tex., Houston—Harris Co., H. L. Washburn, aud., Courthouse, rejected bids June 14, asphalt paving 1.9 mi. Lockwood Dr., 1.1 mi. Weslayan Rd.; 1.22 mi. Buffalo Speedway; 2.2 mi. San Felipe Rd. $75,000. Will re-advertise.

Tex., San Antonio—City, Alfred Callaghan, mayor, rejected bids June 3, Main Ave. street extens. through Military Arsenal Property, grading, asphalt paving, revision, water and sewer lines. L.B. **$93,730.** CD 6/9—ENR 6/17, under LB.

Vermont—State Hy. Dpt., Montpelier, June 18, imprv. 1.689 mi. Granville, from Dwyer Bros. of Rhode Island, Inc., Farewell St., Newport, R. I., **$51,749;** 1.758 mi. Shrewsbury, from Lambert Constr. Co., Montpelier, **$185,515.** CD 6/9.

Virginia—State Hy. Dpt., Richmond, June 17, imprv. 0.48 mi. Russell Co. from Moore Bros., Staunton, **$62,730*****4.82 mi. Amherst Co., from J. R. Ford Co., Inc., Lynchburg, **$102,890*****0.18 mi. Mecklenburg Co., from Perkins-Barnes Constr. Co., Blackstone, **$305,645*****1.656 mi. Roanoke Co., from Wiley N. Jackson, 108 1 St., S. Roanoke, **$53,153***** 14.43 mi. Patrick and Henry Counties and 8.16 mi. Carroll Co., from Adams & Tate Constr. Co., Roanoke Ave., Norwich, Roanoke, **$72,057** and **$108,539** respectively. CD 6/3—ENR 6/10.

CONTRACTS AWARDED

●**California** — State Div. Hys., Sacramento, imprv. 12 mi. road and rein.-con. bridges, etc., San Diego Co., to Griffith Co., 1060 S. Broadway, Los Angeles. **$1,642,999.** Bids 6/3, awarded 6/17. CD 6/8—ENR 6/10, under LB.

Maine—State Hy. Dpt. Augusta, imprv. 6.33 mi. Lyman, North Kennebunkport, Biddeford, to Frank Rossi, R.F.D. 5A, Gardiner, **$325,919;** 4.15 mi. North Kennebunkport and Biddeford, to John Iafolla Constr. Co., Peverly Hill Rd., Portsmouth, N. H. **$54,647.** Bids 6/16, awarded 6/17. CD 6/9.

Neb., Omaha—Douglas Co., John Slavik, clk., Omaha, black topping Valley to Venice Rd., to Yant Constr. Co., 917 N. 45 St. **$106,923.** Bids 6/10. L. E. Adams, Omaha co. engr. and Earl Whittaker, Omaha, co. main. engr. CD 3/18—ENR 4/3.

†**N. C., Camp Lejeune (Br. New Bern)**—Yards & Docks, Marine Barracks, Camp Lejeune, enten. main service road Spec. 19983, to Z. A. Sneedens Sons, Wilmington. **$118,000.** Bids 6/2. CD 5/17—ENR 5/20.

Tex., Houston—Harris Co., E. A. Lyons, comr., Precinct 4, Courthouse, asphalt stabilizing 4 mi. Hagar Rd., own forces. **$61,000.** CD 8/28/47—ENR 9/18/47.

EARTHWORK, WATERWAYS

BIDS ASKED

Bids Asked June 30

†Louisiana—U. S. Eng., foot of Prytania St., New Orleans, Zone 9, two 75 ft. treated timber bridges over drainage ditch, Bayou Barrow to Saline Bayou, Mile 2.05 and Mile 4.1, Aloha-Rigolette Area, Grant and Parpides, Serial No. Eng.-16-047-48-474.

Bids Asked July 14

†Arkansas—U. S. Eng., Vicksburg, Miss., approx. 490,000 cu. yd. earthwork on north bank of Arkansas River, Inv. Eng.-22-052,48-483.

Bids Asked July 21

†Oregon—U. S. Eng., Pittock Block, Portland, 2,420 ft. sand filled, steel sheet pile breakwater with gravel roadway on top and 2 steel pile shore wings, totaling 1,280 ft. in length in Columbia River at Astoria between 33 and 39 Sts., Clatsop Co.

LOW BIDDERS

†New Jersey—U. S. Eng., 121 W. Broad St., Phila., Pa., June 16, removing, disposing approx. 157,000 cu. yd. material lying above a plane 12 ft. below local mean low water 100 ft. wide, Cohansey River, providing at 100 ft. wide channel between Fairton and Bridgeton, Serial No. Eng.-36-109-48-158, from Norfolk Dredging Co., P. O. Box 486, Norfolk, Va., **$50,240.** Est. $56,520. CD 5/18—ENR 5/20.

Tex., Cotulla—La Salle Co., rejected bids June 14, drainage structures, LB. **$234,840.** Project indefinitely postponed. CD 5/21—ENR 5/27.

CONTRACTS AWARDED

†Wyoming—Bureau Reclamation, Dpt. Interior, Building 1-A, Denver Federal Center, Denver, Colo., Schedule 1, preparation concrete aggregates at Krump Deposit, Spec. R6-RP-12 (Region 6), Riverton Proj., to Gilpatrick Constr. Co., Riverton. **$94,580.** CD 4/14—ENR 4/22.

AIRPORTS AND AIRBASES

BIDS ASKED

Bids Asked June 29

Wis., Rhinelander—RUNWAY—Rhinelander-Oneida County Airport Comn., Rhinelander, 50,000 sq. yd. 6 in. plain concrete runway, underground fibre conduit. Plans deposit $15. Genisot Engr. Co., 1512 Eagle St., eng. CD 5/18—ENR 5/20.

Bids Asked July 5

Tex., McAllen—AIRPORT—City, Wm. L. Schupp, mgr., Miller Airport imprvs., 2,800 ft. northwest and southeast, flexible base surface treated, runway, incl. clearing, grubbing, grading, drainage, etc. $50,000. Plans deposit $20. H. E. Show Eng. Co., McAllen, engr. CD 8/9/46—ENR 8/22/46.

LOW BIDDERS

Mo., St. Louis—AIRPORT IMPRVS.—City, Bd. P. Service, 304 City Hall, 12 and Market Sts., June 15, taxi-ways for plane loading facilities, incl. 21,200 sq. yd. grading, paving, expansion joints, etc., at Lambert-St. Louis Municipal Airport, from Israel Bros., 8800 Maryland Ave., Clayton, St. Louis, Zone 5, **$91,315.** Est. $105,000. CD 5/19—ENR 5/27.

CONTRACTS AWARDED

†Pa., Johnsville—WASTE TREATMENT PLANT—Pub. Wks. Office, Phila. Naval Base, Phila., Naval Air Development Station Industrial Waste Treatment Plant, to Ralph S. Herzog, 1505 Race St. Phila. **$51,328.** Bids 6/14. CD 6/9.

PUBLIC BUILDINGS

BIDS ASKED

Bids Asked July 1

Ia., Independence—State Bd. Control, Des Moines, employees bldg. at Independence State Hospital. $300,000. Ralph Arnold, Des Moines, state archt. CD 5/19—ENR 6/10.

Bids Asked July 7

Miss., Louisville—Winston Co. Bd. Supervs., c/o Shelby Woodward, Courthouse, furniture factory. $150,000. Plans deposit $15. CD 11/19—ENR 12/11.

†N. M., Los Alamos—U. S. Atomic Energy Comn., P. O. Box 1539, Santa Fe, 1 story, 66,400 sq. ft. brick, tile high school, incl. inside swimming pool. $475,000. Plans deposit $15. Extended date. CD 6/18.

Bids Asked July 8

La., New Iberia—Iberia Parish School Bd., New Iberia, 1 story, school addn. Plans deposit $20. Favrot & Reed, 402 Nola Bldg., archts.

Bids Asked About July 15

O., Columbus—Ohio State University, Columbus, Commerce Dpt. college bldg. Bellman, Gillett & Richards, 518 Jefferson St., Toledo, archts. CD 5/24—ENR 6/10.

N. C., Raleigh—State College, Raleigh, armory-coliseum. Ross Shumaker, c/o State College, archt. Tentative date. Bids 6/2 rejected L.B. **$385,900** plus alternate **$74,200.** CD 6/8—ENR 6/10, under LB.

Bids Asked July 16

†Wyoming—Bureau Reclamation, Dpt. Interior, Building 1-A, Denver Federal Center, Denver, Colo., constructing Casper substation, Kendrick Proj., approx 3½ mi. west of Casper, and 1,500 ft. south of U. S. Hy. 20, Spec. 2303.

LOW BIDDERS

Colo., Fort Morgan—School Dist. 3, Fort Morgan, rejected bids June 16, Junior-Senior High School addn. **$550,000.** Will readvertise John K. Monroe, 400 Security Bldg., Denver, engr. and archt. CD 6/9.

Fla., Daytona Beach—City, c/o City Mgr., June 15, Peabody Auditorium, from J. L. Ewell Constr. Co., Lakeland. **$765,000.** CD 6/4.

Miss., State College—Bd. Trustees Institutions of Higher Learning, Capitol National Bank Bldg., Jackson, rejected bids Apr. 9, gymnasium at Mississippi State College. L. B. **$661,733.** under LB. CD 4/15—ENR 4/22.

†N. C., Camp Lejeune (Br. New Bern)—Pub. Wks. Office, Bldg. 1005, cancelled bids to have been opened June 24, electronics equip. storage, Spec. 20248. CD 6/9—ENR 6/17.

●†Oregon—U. S. Eng., Pittock Block, Portland, June 11, furnishing four 111,300 hp. hydraulic turbines and governing equip. for McNary Dam, Serial No. 35-026-48-725, from Allis-Chalmers Mfg. Co., 1126 S. 70 St., Milwaukee, Wis. **$5,593,530.** CD 6/3.

Wis., Kenosha—Housing Auth. of City of Kenosha, Kenosha, June 11, 108 houses, from J. Peter Larsen, 6906 Sheridan Rd. **$7,575** each. CD 4/27.

CONTRACTS AWARDED

●†Montana—Bureau Reclamation, Dpt. Interior, Bldg. 1-A, Denver Federal Center, Denver, Colo., Hungry Horse Dam, Hungry Horse Proj., Spec. 2243, f.o.b. 1,250,000 bbl. portland cement, f.o.b. Metaline Falls, Wash., to Lehigh Portland Cement Co., 111 W. Washington St., Chicago, Ill., **$4,000,000***** f.o.b. 1 625,000 bbl., f.o.b. Irwin, Wash., to Spokane Portland Cement Co., Old National Bank Bldg., Spokane, Wash., **$1,812,500***** 625,000 bbl., f.o.b. Trident, to Ideal Cement Co., Denver National Bank Bldg., Denver, Colo., **$2,062,500.** Grand total $7,875,000. Bids 5/20, awarded 6/15. CD 5/27—ENR 6/3, under LB.

Mont., Miles City—Custer Co., Courthouse, Miles City, general contract courthouse, to J. C. Boespflug Constr. Co., Securities Bldg., Seattle, Wash. Est. **$300,000.** Bids 6/14. CD 6/3.

†N. M., Albuquerque—U. S. Eng., Albuquerque, utilities only, for AEC family housing, Stage I, Inv. 27, to C. H. Leavell, 1900 Wyoming, El Paso, Tex. **$236,000.** Bids 1/19. CD 6/21—ENR 6/24, under CA.

Tenn., Winchester—Franklin Co., Franklin County High School, to Seth Giem & Assoc., 166 Monroe Ave., Memphis. **$713,000.** Bids 6/9. CD 5/21—ENR 5/27.

Tex., Austin—University of Texas, c/o Bd. Regents, D. K. Woodward, Jr. chn., 2 steam generating systems, to Henry Vogt Co., Magnolia Bldg., Dallas, **$413,301.** Est. $250,000. CD 11/19—ENR 11/27.

COMMERCIAL BUILDINGS

BIDS ASKED

Bids Asked June 29

Pa., Allentown—Rialto Corp., 11 N. 10 St., rebuilding store, $250,000. H. F. Everett & Associates, 512 Hamilton St., archts. CD 12/17—ENR 1/1.

Bids Asked June 30

Ky., Lexington — Kentucky Society for Crippled Children, c/o Frankel & Curtis, 572 McClelland Bldg., convalescent home for crippled children. Plans deposit $50. Extended date. CD 3/30—ENR 4/8.

Bids Asked July 7

N. Y., New York—Free Synagogue, 40 W. 68 St., synagogue superstructure completion. $400,000. Block & Hesse, 18 E. 41 St., Zone 17, archts.

LOW BIDDERS

N. C., Salisbury—First Baptist Church, Salisbury, rejected bids May 27, church. LB. **$522,000.** Will re-advertise. CD 6/3—ENR 6/10.

Tex., Corpus Christi—First Baptist Church Congregation, 801 Mesquite St., church, from Gilbert Falbo Co., 107 Morales St., San Antonio. **$803,000.** CD 11/24—ENR 11/27.

CONTRACTS AWARDED

●Calif., San Francisco—Mt. Zion Hospital, 2200 Post St., 3 steel frame, rein.-con. hospital wings providing for 150 addnl. beds to 163 bed hospital, with 1 wing 6 story, 2nd wing 3 story, 3rd wing 1 story, to Engineers Ltd., 225 Bush St. **$3,000,000.** Milton T. Pflueger, 580 Market St. and Skidmore, Owings & Merrill, 1 Montgomery St., archts. CD 5/21—ENR 5/27, under LB.

●Mass., Boston—Boston University, 688 Boylston St., 6 story, 70x218 ft. with 2 story 56x70 ft. wing, structural steel, limestone School of Theology, to Turner Constr., 38 Newbury St. **$2,000,000.** CD 11/17/44—ENR 11/30/44.

N. Y., Brooklyn—Long Island College H pital, 340 Henry St., hospital addn. to known as Polak Bldg., to Turner Constr. 420 Lexington Ave., New York. App **$850,000.** Eggers & Higgins, 542 5 Ave., N York, archts. CD 4/17/47—ENR 5/1/47.

●Tex., Dallas—Atlantic Refining Co., M golia Bldg., 10 story, bsmnt., structural s masonry office, concrete pier and beam f partial air-conditioning to Henry C. Beck Adolphus Hotel. Approx. **$2,600,000.** CD 6 —ENR 6/17, under LB.

Ont., Hamilton—A. P. Brown, 182 We worth St. S., 80 suite co-operative apartm development, Westbourne Park Survey King St., own forces. **$800,000.**

INDUSTRIAL BUILDINGS

BIDS ASKED

Wis., Wauwatosa — FACTORY — Aluminu Bldg. Products Co., 1115 S. 41 St., M waukee, Zone 4, 1 story, 200x230 ft. steel, con crete block factory, concrete fdn. M. B. Co man, 135 W. Wells St., Milwaukee, Zone engr.

Wis., Milwaukee — GARAGE — Edwa Motor Co., 601 W. Wisconsin Ave., Zone 1 story, 60x143 ft., steel, brick, block garag addn., concrete fdn. V. K. Boynton, 611 N Broadway, Zone 2, engr. CD 6/16—ENR 6/2

SOON LETS CONTRACT

O., Toledo — SHOP — Davis-Eddy Moto Sales, 1211 Monroe St., soon lets contract, re modeling automobile sales shop and add story concrete block steel frame body sho $70,000 or more. Bellman, Gillett & Richards, 518 Jefferson St., archts.

O. Toledo—FACTORY—Disalle Plating Co Wayne St., soon lets contract 1 story, ma sonry block, steel factory, concrete fdn $100,000. Bellman, Gillett & Richards, 51 Jefferson St., archts.

CONTRACTS AWARDED

Del., Wilmington—WAREHOUSE—Keebler Weyl Baking Co., G St. and Hunting Park Ave., Phila., Pa., 1 story, 47x121 ft., concrete block, stucco, structural steel warehouse, to Mahony Troast Co., 1500 Walnut St., Phila., Pa. **$70,000.**

●Mich., Iron Mountain—POWER PLANT etc.—Wisconsin-Michigan Power Co., 1 W. Mill St., Appleton, Wis., power plant and dam, south of here, Big Quinenesec Falls on Menominee River, to C. R. Meyers & Sons Co., 50 State St., Oshkosh, Wis. Est. **$2,000,000.** CD 6/3—ENR 6/10.

●Mich., Plymouth — PLANT — Whitman & Barnes Div., United Drill & Tool Corp., 40600 Plymouth Rd., design and construction 1 story, 360x630 ft. mfg. plant, and 2 story, 50x180 ft. office bldg., to Austin Co., 16112 Euclid St., Cleveland, O. Est over **$2,500,000.**

●O., Cleveland — PLANT — Lincoln Electric Co., James F. Lincoln, 12818 Coit Rd., design and construction, masonry, aluminum and steel electrical plant, St. Clair Ave. and E 178 St., to The Austin Co., 16102 Euclid St. Approx. **$10,000,000.** CD 4/22/47—ENR 4/24/47.

Pa., Chester—GASOLINE SERVICE STATIONS—Atlantic Refining Co., 260 S. Broad St., Phila., 2 gasoline service stations, MacDade Blvd. and Edgemont Ave. and 9 St. and Concord Ave., to Laessle Builders, Inc., 117 S. 17 St., Phila. **$70,000.** Lester M. Goldsmith, ch. engr.

Pa., Lansdale — MACHINE SHOP — Trys-Kris Co., 7 and Washington Aves., machine shop, to Hatfield Industries, Hatfield. **$75,000.** CD 5/7—ENR 5/13.

Pa., Nanticoke—FACTORY—General Cigar Co., Inc., W. Church St., 4 story, 40x76 ft., concrete factory addn., incl. warehouse, offices, boiler room, to Sordoni Constr. Co., 45 Owen St., Forty Fort. **$125,000.** Lacy Atherton, Wilson & Davis, Hotel Sterling, Wilkes Barre, archts.

Pa., Sharon Hill—RAILROAD STATION—Pennsylvania Railroad Co., 30 St. Station Bldg., Phila., railroad station, to James McGraw Co., 16 S. Broad St., Phila. **$100,000.** L. R. Strubel, ch. engr. for owner.

Pa., Scranton — FACTORY — Scranton Tobacco Co., Spruce St. and Franklin Ave., 1 story, 12,000 sq. ft., brick, cinder block factory addn., to Breig Bros., 316 N. Washington Ave. **$70,000.** Von Storch & Pearce, 506 Spruce St., archts.

UNCLASSIFIED

LOW BIDDERS

†Nebraska and Kansas — RELOCATING RAILROAD—U. S. Eng., 10 E. 17 St., Kansas City, Mo., June 8, relocating, constructing C. B. & Q. R.R. Co. tracks in connection with Harlan Co. Dam Proj., Serial No. Eng.-25-028-48-210, Harlan Co., Neb. and Phillips Co., Kan., from Missouri Valley Constr. Co., 1029 Omaha National Bank Bldg., Omaha, Neb. **$938,851.** Est. 883,271. CD 6/26—ENR 6/3.

S. C., Florence — STADIUM — Florence Memorial Stadium Comn., N. M. Huckabee, secy., rejected bids June 1, steel, concrete stadium. L.B. **$102,900.** CD 5/21—ENR 5/27

Proposal Advertisements see pp. 174 to 178
Proposed Projects see p. 130

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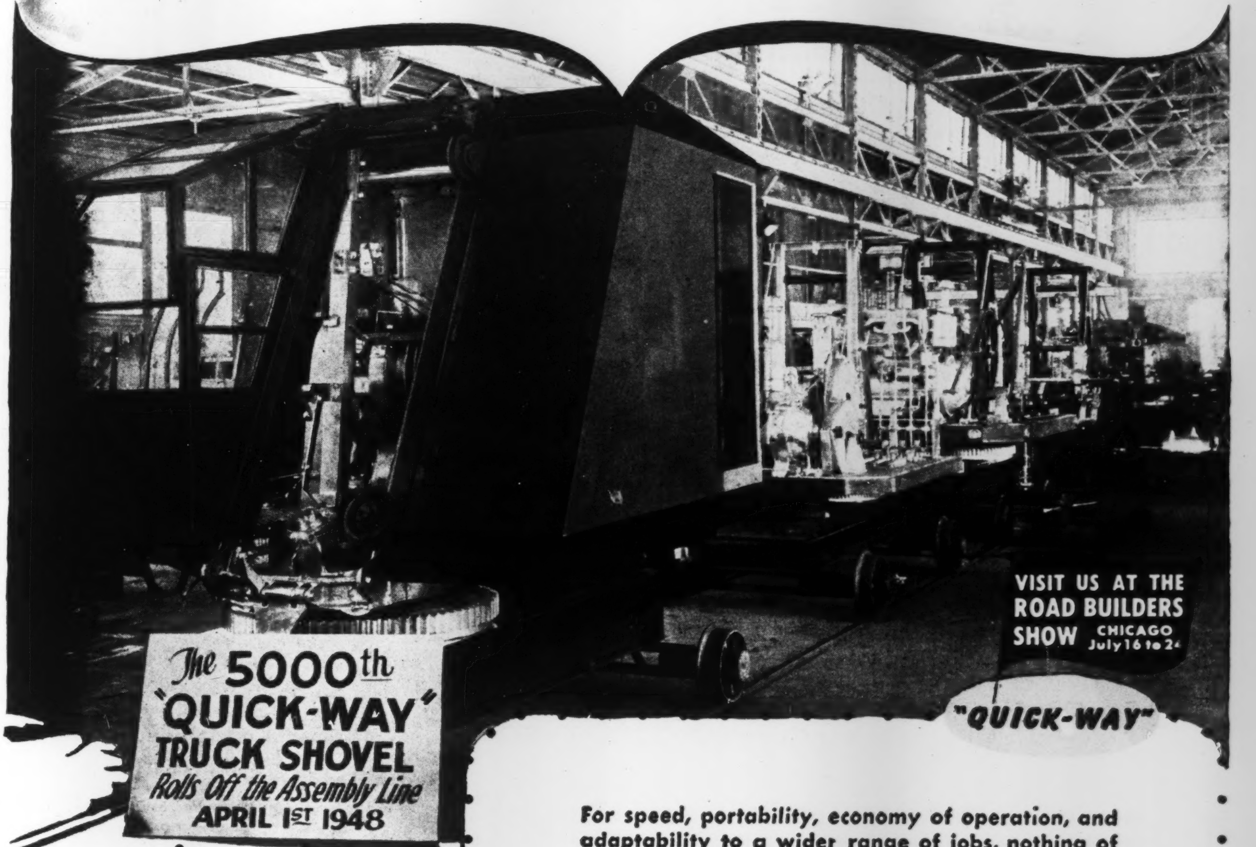

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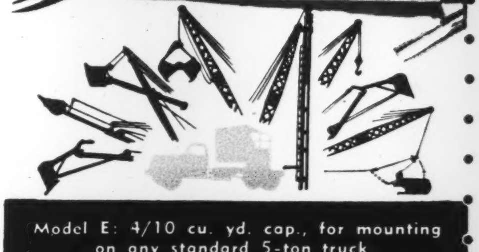

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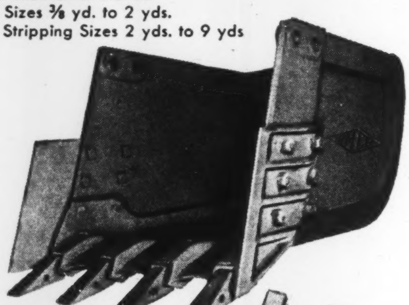

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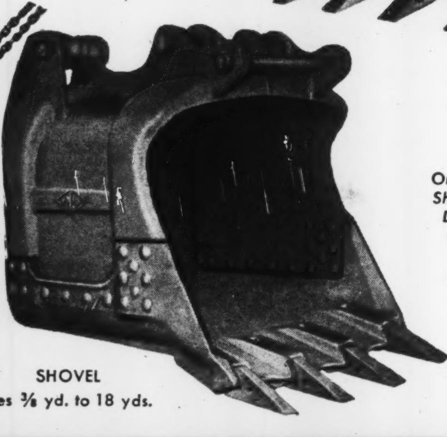

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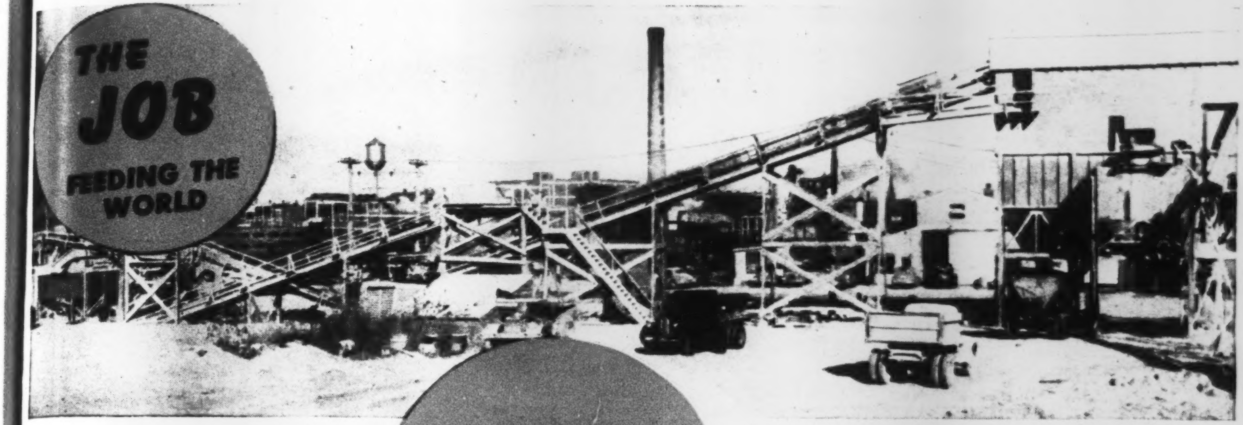

THE JOB

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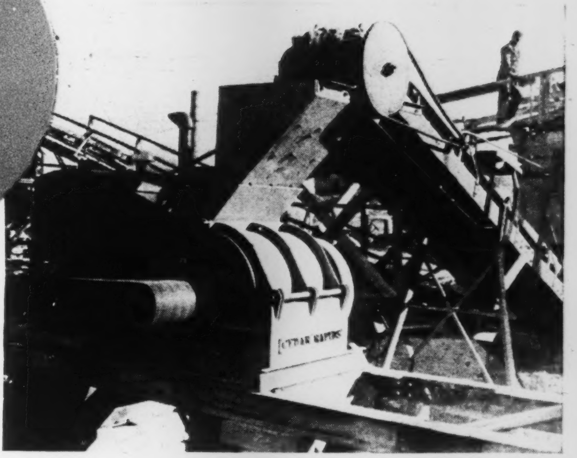
THE EQUIPMENT

CEDARAPIDS HAMMERMILLS



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Cedar Rapids, Iowa

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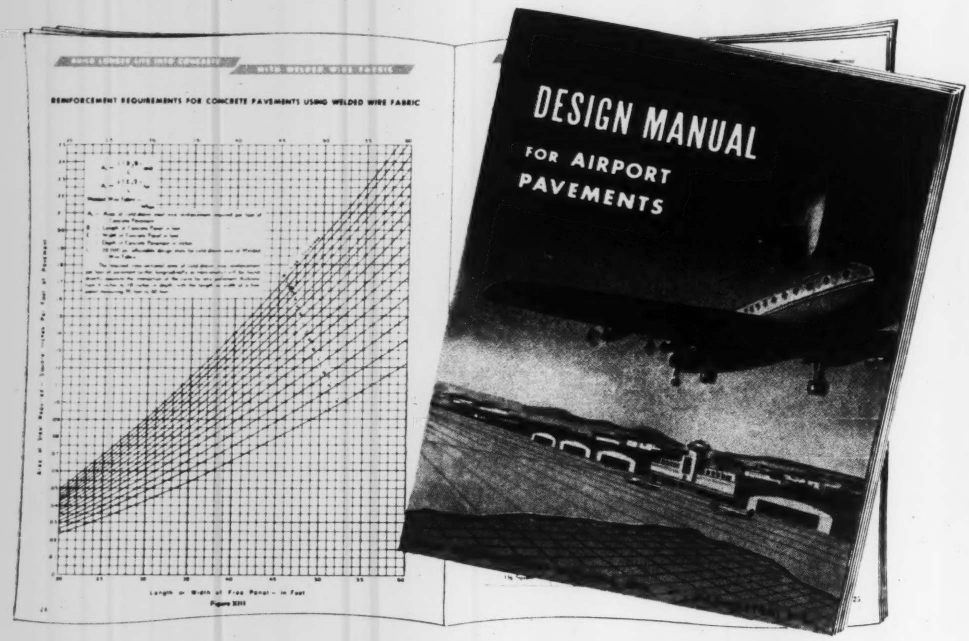
BUILD LONGER LIFE INTO CONCRETE
WITH WELDED WIRE FABRIC
REINFORCEMENT REQUIREMENTS FOR CONCRETE PAVEMENTS USING WELDED WIRE FABRIC
DESIGN MANUAL
FOR AIRPORT
PAVEMENTS

New! Free!

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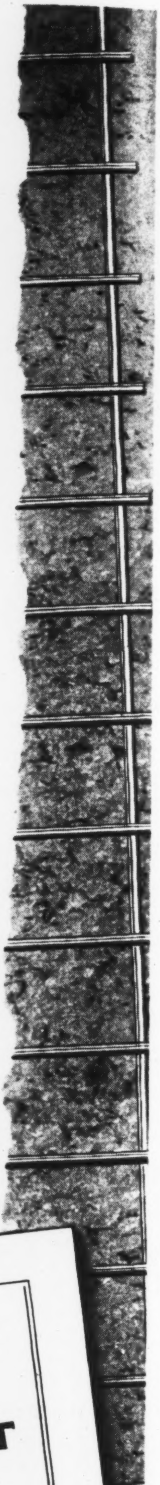
THIS Manual will be of great value to all designers and engineers who are concerned with landing facilities at airports, especially those to be constructed under the Federal Aid Airport Act. Because, in preparing the Manual, our Technical Service Division has followed closely the current requirements of the U. S. Civil Aeronautics Administration.

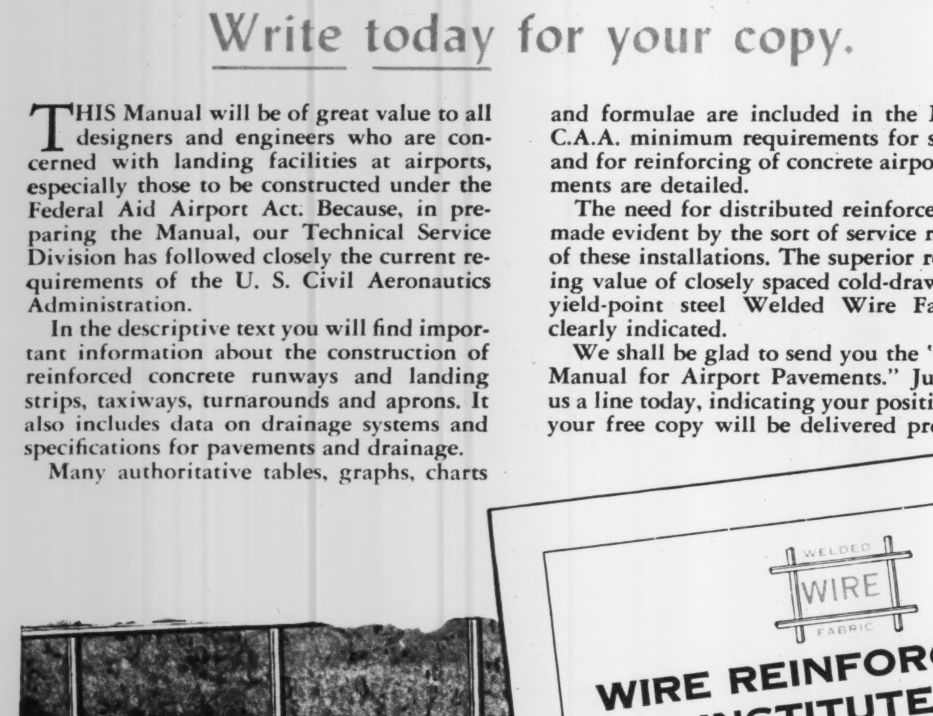
In the descriptive text you will find important information about the construction of reinforced concrete runways and landing strips, taxiways, turnarounds and aprons. It also includes data on drainage systems and specifications for pavements and drainage.

Many authoritative tables, graphs, charts and formulae are included in the Manual. C.A.A. minimum requirements for sub-base and for reinforcing of concrete airport pavements are detailed.

The need for distributed reinforcement is made evident by the sort of service required of these installations. The superior reinforcing value of closely spaced cold-drawn high yield-point steel Welded Wire Fabric is clearly indicated.

We shall be glad to send you the "Design Manual for Airport Pavements." Just drop us a line today, indicating your position, and your free copy will be delivered promptly.




Build Longer Life Into Concrete
With Welded Wire Fabric

WELDED WIRE FABRIC

WIRE REINFORCEMENT INSTITUTE, INC.

NATIONAL PRESS BUILDING
WASHINGTON 4. D. C.

Old road went through narrow underpass (left center), then turned sharply up hill, past farmhouse. New underpass will accommodate 4 lanes, and highway will skirt river.

Taking a Kink Out of the Lincoln Highway

Tons of rock and limestone were moved to make way for new underpass, built adjacent to old highway.

Dale W. Detwiler (left), partner in New Enterprise Stone and Lime Co., points out job detail to R. S. Over, construction superintendent.

Double-barrelled underpass starts to take shape. Bethlehem structural steel, in spans of 118 ft and 54 ft, was erected without interrupting railroad traffic.

At another location on job, Bethlehem reinforcing bars are placed atop 34-ft-span reinforced-concrete bridge.

As part of its road-modernization program, the Pennsylvania Department of Highways has relocated the Lincoln Highway (US 30), in the vicinity of Everett, Pa., thus eliminating a sharp curve and narrow underpass. Construction of the new 2- and 4-lane, 2-mile stretch of road, handled by New Enterprise Stone and Lime Co., New Enterprise, Pa., included building a long revetment, a reinforced concrete bridge, and a railroad underpass. Bridge reinforcing, structural steel, bar mats and road joints were supplied by Bethlehem.

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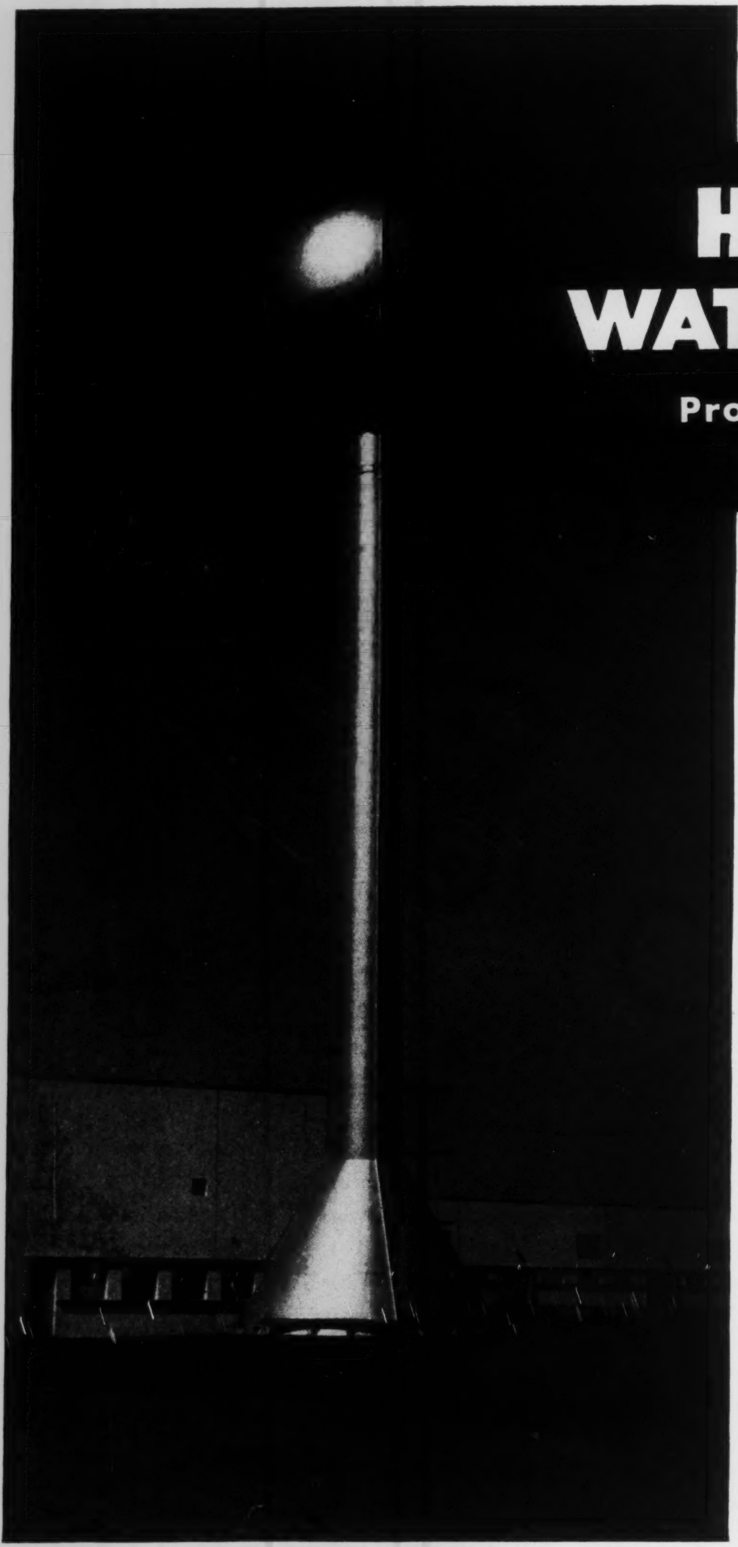

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"The fate of the world sits on this rug"

– JOHN L. LEWIS

NOTE: Paste this editorial in your hat. Re-read it as you start to shiver the next time John L. Lewis cuts off the nation's coal supply.

"Labor monopoly" will mean much more to you then. But if you are worried enough you will get after your Congressman to do his part now — before the shivering starts.

* * *

"The fate of the world sits on this rug."

The men on the rug: John L. Lewis, President of the United Mine Workers, who made the remark; Benjamin Fairless, President, United States Steel Corporation; George M. Humphrey, Chairman, Pittsburgh Consolidation Coal Company; Harry M. Moses, President, H. C. Frick Coke Company; Charles O'Neill, President, United Eastern Coal Sales Corporation; the late John O'Leary, International Vice President of the United Mine Workers; and John Owens, President, District No. 6 United Mine Workers.

The place: Room 800, Carlton Hotel, Washington, D. C.

The time: Last July during the "negotiation" of a new soft coal contract.

The outcome: Another whopping increase in wages and the price of coal, another hike in the cost of living, and a "contract" which binds the United Mine Workers only as long as they are "willing and able to work."

Mr. Lewis was right. The fate of the world did sit on the rug. In fact, it sat at Mr. Lewis' feet, for, as this editorial will explain and as the outcome shows, his power over coal is absolute.

Without coal modern industrial civilization collapses. Without Mr. Lewis' assent coal can not be mined. He has the nation and, in the years 1947-48, the world at his mercy.

The Taft-Hartley Act, good as it is, does nothing to check this kind of monopoly.

I

The Taft-Hartley Act fails to protect the public in many major particulars.

Here are some of them.

1. Labor monopoly is promoted and protected by its continued exemption from the federal antitrust laws. Management has no such exemption and should not have.

2. Industry-wide bargaining, a kind of second-degree monopoly, is left virtually undisturbed. So is union-wide bargaining which extends the power of national unions far beyond a single industry.

3. Featherbedding, the art of getting paid for doing nothing, is left largely intact.

4. The menace of having local utility strikes wreck the health and safety of a community is left untouched. Postponement and persuasion are the only instruments provided to deal with strikes that would wreck the nation.

My purpose in citing these omissions from the Taft-Hartley Act is not to belittle the act or its framers. They did a most courageous and constructive job. They made a real start toward restoring a workable balance in industrial relations in the United States, so far as the law can do it. But they have not completed the job. Among their omissions the two discussed in the next sections of this editorial stand out above all others.

II

The most serious Taft-Hartley shortcoming is its failure to deal with labor monopoly.

Labor monopoly exists wherever a union is so strong that bargaining becomes a sham and the union virtually dictates its own terms.

If an employer or group of employers secures a monopoly or anything approaching a monopoly, prosecution for violation of the federal antitrust laws is in order. That is as it should be, for monopoly means death to economic and political freedom.

But if a labor union secures complete monopoly control over an industry through control of its workers, that union remains above and beyond the antitrust laws. "The fate of the world sits on this rug." By that imperial attitude John L. Lewis fully demonstrated how obsolete is the notion that labor unions are weak and, therefore, need exemption from the antitrust laws. Through the United Mine Workers, Mr. Lewis controls about 90% of the coal miners. (No company controls more than 5% of the nation's coal output.) Wherever he sits he has at his feet the welfare of the whole nation.

Great international unions exercise a comparable measure of monopoly control in other basic industries—steel, transportation, and automobiles, for example.

These labor monopolies can destroy the nation if they are not themselves broken up. Witness the plight of France. There the Communists have found in the great labor monopolies an instrument for shaking the nation to its foundations.

III

The Taft-Hartley Act also leaves untouched industry-wide collective bargaining, which is a kind of second-degree monopoly.

When all or almost all of the employers in an industry get together with the union leaders to agree on wages and working conditions (that is called industry-wide bargaining) they set up a monopoly control. It is a less concentrated monopoly than when the terms are dictated by either side, as Lewis dictates them in coal. But, nonetheless, competition is eliminated and monopoly control is established over wages, which are by far the largest element in the cost of production. It follows that public regulation of collective bargaining—*which means the end of free unions and free management*—is not far behind.

Some employers defend industry-wide bargaining as their only defense against industry-wide unions. Other employers like it because it makes wages and hours uniform for their whole industry.

For those employers who are forced into industry-wide bargaining in self-defense the road to relief is clear. Congress owes it to them and to the public to free them from the necessity of dealing with a monopolistic union. The best way to do that is to remove the exemption of labor unions from the federal antitrust laws.

To those employers who engage in industry-wide bargaining because they like it the proper answer is also quite clear. They (and the union involved) are maintaining a private monopoly which is offensive to the public interest. It should be prevented by law.

IV

Congress should finish the job of eliminating labor monopoly and industry-wide bargaining.

In the course of enacting the Taft-Hartley law last spring the House acted to eliminate the exemption of unions from the federal antitrust laws and to make industry-wide bargaining illegal. The Senate, however, refused to go along.

The principal reason advanced in the Senate for deferring action was that more knowledge is required to legislate intelligently. To get the needed information, a joint Congressional committee was created.

It is standard Congressional practice to stall off tackling a difficult job by creating a special committee to study it. The new joint committee is not likely to prove an exception to this rule—*unless the voters loudly demand of Congress that it get on with its job of protecting the public interest in the conduct of labor relations—a job which is nowhere near done.*

Helpful and effective as many of its provisions are, the Taft-Hartley Act does not face squarely the central principle of industrial relations in a free society. That principle is this: *Neither employers nor organized workers, separately or in combination, shall exploit the public by establishing a monopoly.*

Do not let your Congressmen go to sleep on the job of solving that problem or hide from it because of fear. The perfect solution may be hard to find. But the problem can be largely solved by making organized labor subject to the federal antitrust laws just as management is now subject to them. If that problem goes by default your children and your grandchildren will really know what slave labor means.

James H. McGraw, Jr.

President, McGraw-Hill Publishing Company, Inc.

THIS IS THE 64TH OF A SERIES

1949–

Can Be a Good Year Too

You can expect good business to run on well through 1948.

But old-time competition is close upon us.

And 1949 will be a critical year for all of us – making lower taxation imperative NOW.

These are the main conclusions drawn from a nation-wide survey of industry's plans for new plants and equipment which McGraw-Hill has just completed. Here are the major findings:

1. Capital expenditures in 1948 may be a little lower — but at the most only 8% lower – than in 1947.
2. In 1949 capital expenditures may decline. 1949 plans are still fluid. However, those which have been projected now show a falling off. (Washington planners, please note: Current official attempts to discourage capital expansion may turn out to be superfluous – or downright dangerous.)
3. Industry's initial postwar rebuilding will be 85% complete at the end of 1948. When this first wave of deferred maintenance and expansion is finished, American industry will have more than half again the capacity it had in 1939. This does not mean the end of needed capital expenditures. Business will need to invest much more. (President Truman sets an investment goal immediately ahead of $50 billion.) But it does mean that tough competition is returning fast.

• IF YOU WANT *full details of the McGraw-Hill survey of Capital Expenditures, which is summarized in this editorial, write to the Economics Department, McGraw-Hill Publishing Company, 330 West 42nd Street, New York 18, N. Y.*

These are solid facts, based on plans which are firmly made by a broad cross-section of American industry and which the McGraw-Hill survey revealed.

The greatest contribution of this survey is the information it supplies on business plans for the purchase of new plants and equipment. What business planned to do about such expenditures was by far the biggest unknown element in the 1948 outlook. For, if business planned to slash its outlays for plants and equipment this year, that fact alone could bring a sharp downturn in business.

In making this survey, McGraw-Hill researchers all over the nation personally interviewed top executives of companies selected to make up a scientific cross-section of industry. Each executive was asked to give, *not his opinion* about general business trends, but *factual details* about his company's plans for 1948. By adding together the plans of the companies interviewed, McGraw-Hill has secured, for the first time, a reliable picture of what business plans to do in the months ahead.

Here are plans for 1948 and 1949, as revealed by the survey:

1. Industry still needs more than a year to finish its initial postwar maintenance and rehabilitation program.

Among manufacturing industries, top executives report that 64% of their program for the immediate postwar period is now complete. According to present plans, 85% will be installed by the end of this year even though some manufacturing industries still have a long way to go. For instance, oil companies will complete only three-quarters of their presently planned expansion program by the end of 1948.

2. Business may spend less on new plants and equipment this year than the record $16.1 billion spent last year. But the decline

probably will be negligible and certainly will not be great enough to bring on a business recession.

At the time McGraw-Hill interviewed top executives, some companies had not yet approved their 1948 capital budgets. Under the extreme assumption that those particular companies will make *no* capital expenditures in 1948, industry's 1948 bill for new plants and equipment will run to $14.9 billion, or 8% below last year's record figure. Under the more realistic assumption that those companies will cut their capital investment only as much as the companies which had already drawn up their plans for 1948, industry's 1948 capital budget will run to almost $15.8 billion, a decline of only $300 million from 1947.

Thus the over-all conclusion of the McGraw-Hill survey is that capital expenditures by business will be only slightly lower this year than last.

3. Business executives will not slash their 1948 capital budgets unless they are convinced that a real slump is in the offing—and they are not convinced now.

Almost two-thirds of all manufacturing companies say they would not cut capital budgets sharply even if business activity declined 20%. What is more, even a 15-20% boost in wage rates would have little effect on projected capital budgets. If wages go up, 57% of manufacturing companies would not change their capital budgets, 26% would increase them, and 17% would cut them.

4. Most executives look for an increase in their company's sales this year.

More than half of all manufacturing companies are planning on a sales increase over last year of 10% or more. A third of them say sales will be about the same as in 1947. And fewer than 10% look for lower sales.

5. Manufacturing companies will finance much of their purchases of new plants and equipment in 1948 from funds set aside out of past or current earnings.

Utilities and railroads, on the other hand, must go to the securities markets or commercial banks to finance most capital expenditures.

Although manufacturing companies say they can finance this year's capital expenditures in large part from current profits and past savings, all evidence indicates that, to do so, they will use up most of the funds they earmarked during the war for this purpose. So in 1949, industry must go to the capital markets or to the commercial banks if it is to continue to spend for capital purposes. If the securities markets continue to lie in the doldrums, *as they will under present tax laws*, only companies with triple A credit ratings will be able to raise funds that way.

6. Purchases of new plants and equipment may fall off in 1949.

The McGraw-Hill survey collected all available evidence on plans for 1949 capital budgets. Fewer than 40% of all manufacturing companies now have definite plans for 1949. Of those that have plans, 45% intend to spend less than in 1948, 30% plan to spend the same amount, and a quarter expect to spend more. These preliminary decisions would seem to indicate that capital investment may fall off in 1949.

7. Industry's production capacity in 1949 will be far above prewar.

Manufacturing capacity will be more than 50% greater than in 1939 once the present wave of postwar building is complete. Almost a third of all manufacturing companies report that their capacity will be double or more than double the prewar figure. Thus, 1949 may see a huge increase in production of many things that now are hard to buy.

The last two points in this summary mean that 1949 will be a critical year. We must forestall a sudden drying up of capital expenditures in that year. We must be able also to absorb a great outpouring of production both of capital and consumer goods.

What will happen to business in 1949, therefore, will depend on how successful we are this year in dealing with such momentous problems as taxation, foreign aid and prices. But 1949 *can* be a good year too.

The next editorial in this series will discuss the pivotal problem of taxes.

James H. McGraw, Jr.

President, McGraw-Hill Publishing Company, Inc.

THIS IS THE 65TH OF A SERIES

Why You Cannot Get Ahead As Your Father Did —

THE UNITED STATES is being forced toward socialism by a tax revolution of far-reaching consequences.

We have not yet felt fully the deadly impact of this revolution because inflation and the postwar boom have delayed its effects.

But from now on, more and more people will feel its bite. Already it is the dominant element in our economic life. Already it is the major factor in our chances of keeping our jobs and of getting ahead.

Here are some pertinent facts on this tax revolution:

1. The tax load that our nation can safely carry has long since passed the danger point.

Our capitalistic system is in real danger when taxes take more than 20 percent of our national income (or 20¢ out of every income dollar). Beyond that point there are not sufficient dollars left in private hands for capitalistic America to raise the capital required to keep its industry going. So we are right now being nudged further and further into socialism.

For today taxes take *twenty-five* percent of national income (or 25¢ out of every income dollar).

2. The tax revolution has undercut the incentives that help us to get ahead.

The group whose incomes range from $5000 up now turns over about one-half of its *total* income to federal, state, and local tax collectors. Before the war, this group gave the tax collectors one-third of its collective income.

In sharp contrast, the group of people with incomes under $5000 pays the tax collectors 20% of its income for direct and hidden (mostly hidden) taxes—against 18% before the war. This lower-bracket group needs immediate tax relief but I believe most sincerely that persons earning less than $5,000 have a very vital reason for also supporting tax relief in the much more heavily hit upper brackets.

As you get ahead, you expect your taxes to go up. Taxes should be levied, in principle, according to ability to pay. But today tax rates rise so sharply that they virtually destroy all incentives to get ahead, to save, and to invest in new and untried enterprises that open up new jobs. *The progressive tax idea now carried to punitive extremes has become a destructive tax revolution.*

Today the U.S., envied by all the world for the wealth it has won under capitalistic incentives, has cut its incentives below those offered by that state whose police methods strike terror into the hearts of all workers.

Soviet Russia rewards successful managers, writers, and scientists better relatively than we do under our present tax system.

A revolution that sweeps away incentives will quickly sweep away our free enterprise economy. The only substitute ever found for free incentives is the whip-and-lash compulsion of the police state. And no police state has ever been able to match the production of a free people with a free economy that gives adequate rewards to individual producers.

3. The tax revolution hits squarely the average American's chances of keeping a job and of getting ahead.

If you make less than $5000 a year you may well ask why you should worry about a tax revolution that seems directed at the comparatively small group, about 10% of American families, who make $5000 a year or more.

The answer, it seems to me, is that "risk capital," the money that makes new jobs when invested in growing companies or in new businesses, must come largely from the people making more than $5000 a year. The others usually cannot afford to take any risks with their savings.

It was the savings of this 10% group that made possible the huge growth in American industry and American jobs and our progress in raising American living standards in the years before 1930.

Now the government is taking so much from the 10% group in taxes that they cannot afford to risk any savings they manage to accumulate. Most of their savings now go to insurance companies and savings banks which are barred by law from making risky investments or investments even in seasoned common stocks.

The flow of risk-capital from this 10% group can only be renewed by reducing their taxes. The result will benefit everyone over the difficult years to come by providing more and steadier employment for all.

The cost of the presently proposed reduction, *less than 1% of the national income,* can well come out of current revenue surplus. It will be repaid manyfold by the new enterprises it will stimulate.

4. Jobs will be lost if risk-capital does not increase.

Unless the flow of risk-capital into business *can be doubled* and *trebled* in the next few years, business investment in job-making new plants and equipment will drop sharply. The McGraw-Hill survey of prospective capital expenditures, reported in the previous editorial in this series, made that quite clear.

When such a drop in business investment has come in the past, it has brought with it a general slump in business — and unemployment.

As we work through the enormous demand for goods of all kinds built up during the war years, and as the war-accumulated savings of businesses and individuals are spent, it will be harder and harder to keep production and employment at today's high levels.

Then—at the very time that we shall need all our drive to maintain prosperity—we shall be hit by the full impact of the tax revolution.

5. Compounding these troubles is a tax system as out-of-date as an oxcart.

Twenty years ago, when taxes took only twelve cents out of the national income dollar, our rattletrap tax system was little more than a nuisance. Today, when it takes twice as big a bite, its double-taxing of the earnings of investors, its discriminatory excises, and the overlapping of federal, state, and local levies are a fatal handicap. A new system, a fair system, a rewarding system, is a necessity if American initiative and enterprise are to have a fair chance.

What Congress does now about federal taxes will bear crucially on our ability to sustain prosperity.

By demanding economy in government and by re-designing the tax system to stimulate initiative and risk-taking, Congress can multiply many times our chances of maintaining full employment and of raising living standards.

By allowing people to save more and by renewing the incentive to risk capital in new enterprises, Congress can actually insure a bigger tax return in the years ahead. More business will result — and pay more taxes.

That is the only way that a free people with a free economy can carry the tax load.

That is the best way that our government can improve our chances of keeping our jobs and of getting ahead. I suggest that you discuss these vital matters with your chosen representatives in Congress, in your state government, in your local community.

James H. McGraw, Jr.

President, McGraw-Hill Publishing Company, Inc.

THIS IS THE 66TH OF THE SERIES

Only a Prosperous America Can Be Free

DURING May 50 million American workers will get from the Congress of the United States a real incentive to work.

This incentive is called a tax cut. Beginning May 1, the withholding tax on incomes will be reduced, giving everyone a much-needed increase in take-home pay.

But the tax cut will have a far more important effect. It may be literally a life-saver for American employment and production – and, hence, for the stability of the world. It will help to do two things which must be done if our economy is to continue to furnish good jobs and good earnings.

1. *It will generate part of the private funds for investment in common stocks – the "risk capital" which we need to sustain prosperity.*
2. *It will provide part of the incentives necessary to make American business management still more effective.*

These two predictions are not advanced as matters of opinion. They are based on facts reported by McGraw-Hill field editors.

These facts show why the reductions in upper bracket income tax rates are most significant for our continued prosperity. For the first time in more than twenty years the tax burden on people who can afford to risk their savings has been lightened. To find out what this will mean to the economy, McGraw-Hill field editors all over the nation asked a group of business executives making $15,000 a year or more how they will use the money which the tax cut gives them. Here is what they said:

1. They plan to save – not spend – three-fourths of the money they keep as a result of tax reduction.
2. They plan to invest one-half of these savings in common stocks. If all persons making over $15,000 follow this pattern, they will make available about a half billion dollars of risk capital for American industry.

WHAT THE TAX CUT WILL DO

What will upper bracket taxpayers do with their tax savings?

What can business expect as a result?

TO ANSWER THESE QUESTIONS, McGraw-Hill field editors interviewed a carefully selected sample of business executives earning $15,000 a year or more. Here, for the first time, are solid facts that show how tax reduction will effect the supply of risk capital and business incentives. These are the results:

1) How much of your tax reduction will you save?	74%
2) How much of your tax savings will you invest in common stocks?	52%
3) Will lower taxes lead you to switch some of your investment in bonds to stocks?	Yes 28%
4) Have you passed up an opportunity to invest in a new business in the last five years because the return after taxes did not justify the risk?	Yes 40%
5) Will lower taxes make you more inclined to take a risk on a new business?	Yes 80%
6) Have you turned down the opportunity to take a bigger job in the last five years because taxes would take too much of the additional income offered?	Yes 18%
7) Do you know of actual cases of executives who have turned down bigger jobs or more work because of taxes?	Yes 38%
8) Will lower taxes make you more inclined to take on a bigger job or more work?	Yes 59%

3. They also will switch some of their present savings from bonds and bank accounts to common stocks. This might easily add a billion dollars or more to the supply of risk capital.

The one-half billion dollars of tax savings and the funds switched from other investments into common stocks is not enough to end the shortage of risk capital. But it is a start.

Before passage of the tax law, risk capital had been growing increasingly scarce.

One measure of the scarcity is that last year only four-tenths of 1% of national income went into new common stocks. In 1925, a year of normal prosperity, almost 3% of national income was invested in new common stocks.

Another measure is that between 1940 and 1947 people actually reduced their holdings of corporate stocks and bonds by nearly a billion dollars. During the same period, people salted away almost $150 billion in such safe havens as cash, bank deposits, and government bonds.

This drought of risk capital hit us just when we need a vastly increased flow of risk capital to finance the expansion and improvement of our American productive machine. We need risk capital to search for new oil fields and to build new pipelines and refineries. We need capital to expand our over-loaded electric and gas utilities. We need it to finish reequipping our airlines and railroads and bus lines. We need it to modernize our textile production. We need it to keep pace in the magical, booming chemical industries. We need it to launch the new industry of television.

We need capital for all this work and for much more besides. And we must do all this work if we are to keep the United States dynamic and if we are to create new and better jobs.

The tax cut comes just in time. As the last editorial in this series showed, the flow of risk capital must double or triple if we are to avoid a cutback in industrial expansion next year. A major reduction in industrial expansion because of a shortage of risk capital would menace our prosperity. Whenever capital expansion has sagged, the whole economy has sagged. That is the record. That is why every American has a crucial interest in breaking the shortage of risk capital.

The tax reduction now going into effect helps relieve that shortage. In my opinion, we need still other tax changes to assure enough risk capital for healthy industry and healthy employment.

We should encourage the rapid depreciation and replacement of plants and equipment to keep America efficient.

We should eliminate the double taxation of stockholders' incomes.

We should permit full averaging of good years and bad in calculating income tax payments.

We should cut tax rates again as soon as we can.

The tax cut of 1948 will prime the flow of capital. We must keep it flowing.

The tax cut also encourages our successful men and women to work harder and more effectively.

The McGraw-Hill editors collected some solid facts to show how seriously heavy taxes have discouraged business leaders. Here they are:

1. One out of seven persons the editors questioned said that they had turned down positions with greater responsibilities because heavy taxes would take most of the greater pay that went with the harder job.
2. Six out of ten executives would be more inclined to accept a more responsible job now that taxes will let them keep more of the added pay such a job would bring.

We all have a stake in incentives which make men work harder, especially talented men. The more we each work, the more we all have.

The tax reductions so far made will leave the government more than enough revenue to meet all its expenses, including the proposed defense expenses, and still reduce the national debt. If more defense money becomes necessary, vigorous economy on less essential government expenses will make possible both stronger military defenses and a better tax system. We need both.

Only a prosperous America can be strong enough to remain free—and to help keep the rest of the world free.

James H. McGraw, Jr.

President, McGraw-Hill Publishing Company, Inc.

THIS IS THE 67TH OF THE SERIES

5,000,000 Youngsters Need Our Help Now

THE bumper wartime crop of babies, about 5,000,000 larger than the population experts expected, is reaching school age.

At school these youngsters should find a good education awaiting them. That is their most cherished American birthright.

But unless something is done quickly, millions of these children will be cheated. They will crowd into classrooms already run on double shifts. They will move in with children who are now sitting two in a single seat. They will read germ-loaded books mangled by a generation of use by grimy hands.

I

So the continuing crisis in American education is given a new twist by unexpected pressure on school plant and equipment.

The U. S. birthrate has jumped by leaps and bounds. Instead of declining in the '40s, as the experts expected it would, the rate climbed from 17.9 per thousand in 1940 to 21.5 in 1943. It jumped to 25.9 in 1947, an increase of 45 percent since 1940. Result—by 1956 elementary school attendance in the United States is expected to jump from 18,200,000 to more than 23,400,000, an increase of about 5,200,000, or more than one-fourth.

The rush has already begun. It will pick up speed next fall.

Now, while this pressure has been building up, our public schools and their equipment have been running down—first through inevitable wartime neglect, then because inflation and material and labor shortages made it difficult to catch up.

If we are to give this bumper crop of youngsters the break they deserve—and reach the educational standards the nation needs—we must speedily do a major job of educational rehabilitation and expansion.

II

Some headway has been made in overcoming the teachers' salary crisis.

Teachers' salaries are improving. Pay problems were driving good teachers away from their posts in droves not long ago. But in the year since the 57th editorial in this series emphasized that crisis, the average teacher's annual salary has increased about $300—from $2250 to $2550.

True, increases vary enormously from state to state and from town to town. In a few states the average increase has been $500; in some less than $100. But, for the nation as a whole, last year's increase put teachers about even in the race with the cost of living. After taxes, their salaries have risen 68%, and the cost of living 67%, since 1939. In terms of pay increases, however, they are not nearly as well off as are industrial workers, whose average weekly wages after taxes have risen 108% since 1939. They are far behind farmers, whose net income is now four times what it was in 1939. And teachers had notoriously low salaries to start with.

A great deal more needs to be done in raising salary standards to put our school system on a firm footing. There are still about 100,000 teachers, nearly 12% of all public school teachers, who hold temporary or emergency credentials. They cannot meet prevailing standards, and not very severe standards at that, for persons holding their posts.

The salary crisis, however, is easing.

III

But now comes the new crisis in school buildings and equipment.

We would have been hard put to get our schools back into shape after years of wartime neglect—even without a booming birthrate complicating the problem. Right now, 85% of all public school buildings need major remodeling to remove health and safety hazards.

And we aren't building enough new schools to keep up with current needs, to say nothing of catching up on those we were not able to build during the war years. School construction expenditures for 1948 are estimated at $375 million – which is less than what was spent in 1939. With building costs twice as high as they were in 1939, that means we aren't even holding our own—we are falling further behind.

And now comes the rush of war babies.

IV

We must spend at least $11 billion on new schools and equipment in the next decade.

Public and elementary schools must have $6.6 billion. Equally important, another $4.4 billion must be invested in buildings and equipment in our private schools, colleges and universities if they are to meet the demands which will be made upon them. The private school and the privately endowed university are doing their full share and doing it well. The need for them is increasing.

These figures cover only rockbottom needs for educational plant and equipment. But statistics are a very restricted recorder of this crisis.

You can see it better, I'm sure, in schools not very far from your home. There are schools with leaking roofs and outdoor toilets in our greatest cities. There are schools where students still use histories and geographies copyrighted before 1920—books with no mention of World War I, the depression of the 1930's, the Russian Revolution or the rise of the dictators. There are countless schools where modern methods of visual education are completely unknown.

All of these conditions promise to get worse – promptly – as that scheduled 5 million increase in the school population gets rolling.

V

The Metropolitan Life Insurance Company does not indulge in lurid prose. It says after painstaking study of the educational crisis that:

"Unless definite measures are taken immediately . . . large numbers of American boys and girls will be deprived of an adequate education."

Currently we are deeply concerned about our military defenses. We are taking, and I think rightly, emergency measures to strengthen them. But we must regard our schools as a part of our national defense as vital as are our armed forces. This is particularly true in these times of fifth columns and ideological warfare.

If we are wise, we will raise our sights. We will give the continuing crisis in education the same urgent attention being given the more obvious but no more real crisis in national defense.

Go to the school house in your neighborhood and discover what needs to be done to provide for the rising tide of young Americans. Ask your school board and your school administrators and teachers how you can help them.

That is good citizenship.

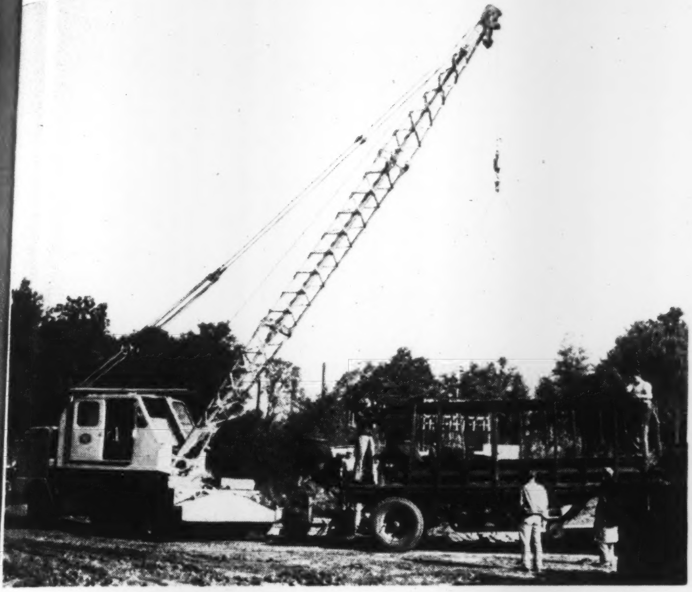
That is patriotism.

That is our duty to the oncoming generation.

James H. McGraw, Jr.

President, McGraw-Hill Publishing Company, Inc.

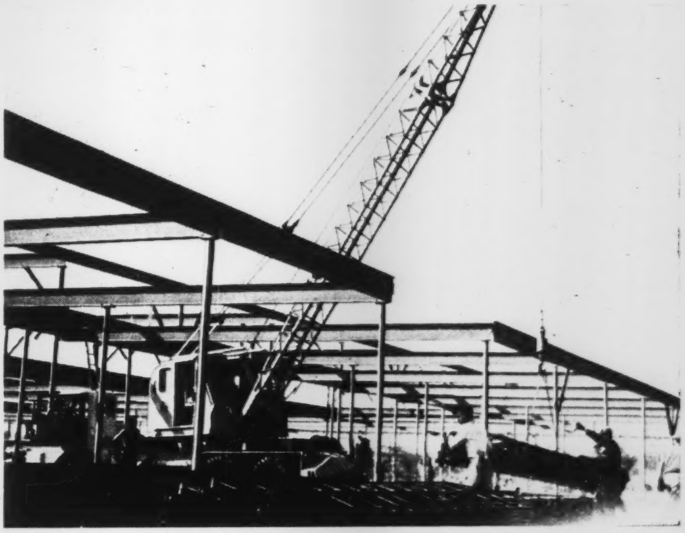
THIS IS THE 68TH OF THE SERIES



Four Jobs...

ONE MORNING

1. **Erect roof trusses**
2. **Unload cast-iron pipe**
3. **Set structural steel**
4. **Place prefab sheathing for roofing crew**



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MICHIGAN

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How Timken® bearings help Le Roi Airmaster last longer, work better

NOEL'S EXPRES
105
LE ROI

Timken bearings on crankshaft of Le Roi Airmaster compressor.

THE Le Roi Company of Milwaukee, Wisconsin, assures long life nd minimum maintenance for their irmaster Compressors by mounting he crankshaft on Timken tapered oller bearings.

Timken bearings hold the crankhaft in rigid alignment—free from leflection and end-play. They prevent vear on both the crankshaft and surounding parts.

Since Timken bearings are tapered n construction they carry any comination of radial and thrust loads. The line contact between rolls and races provides a wide area of bearing support, preventing shaft deflection and affording maximum load capacity.

Timken bearings are manufactured to incredible precision. They retain that precision due to scientifically correct design and the finest material ever developed for tapered roller bearings—Timken fine alloy steel.

Over the years, the dependable performance and continued advertising of Timken bearings have made Timken-equipped products first choice throughout industry. Timken bearings in your product add a valuable sales feature. They build greater acceptance for your product among customers. When you specify tapered roller bearings for your product, specify "Timken". And when buying new equipment, always look for the trade-mark "Timken" on the bearings. The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".

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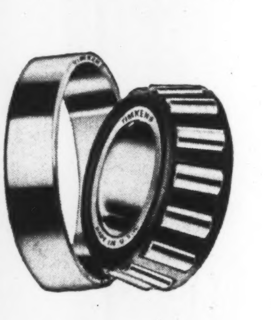

OT JUST A BALL   NOT JUST A ROLLER   THE TIMKEN TAPERED ROLLER   BEARING TAKES RADIAL   AND THRUST   LOADS OR ANY COMBINATION